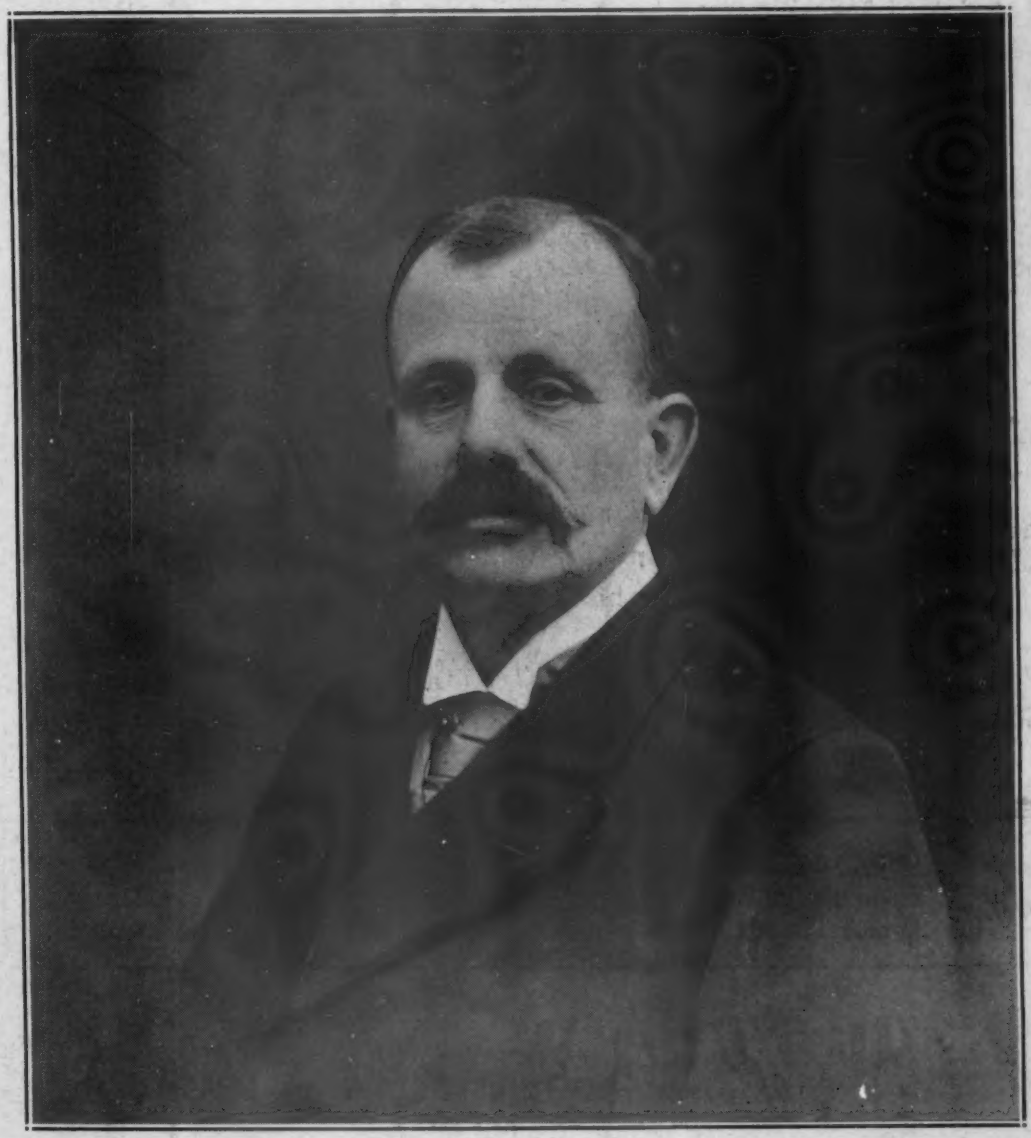
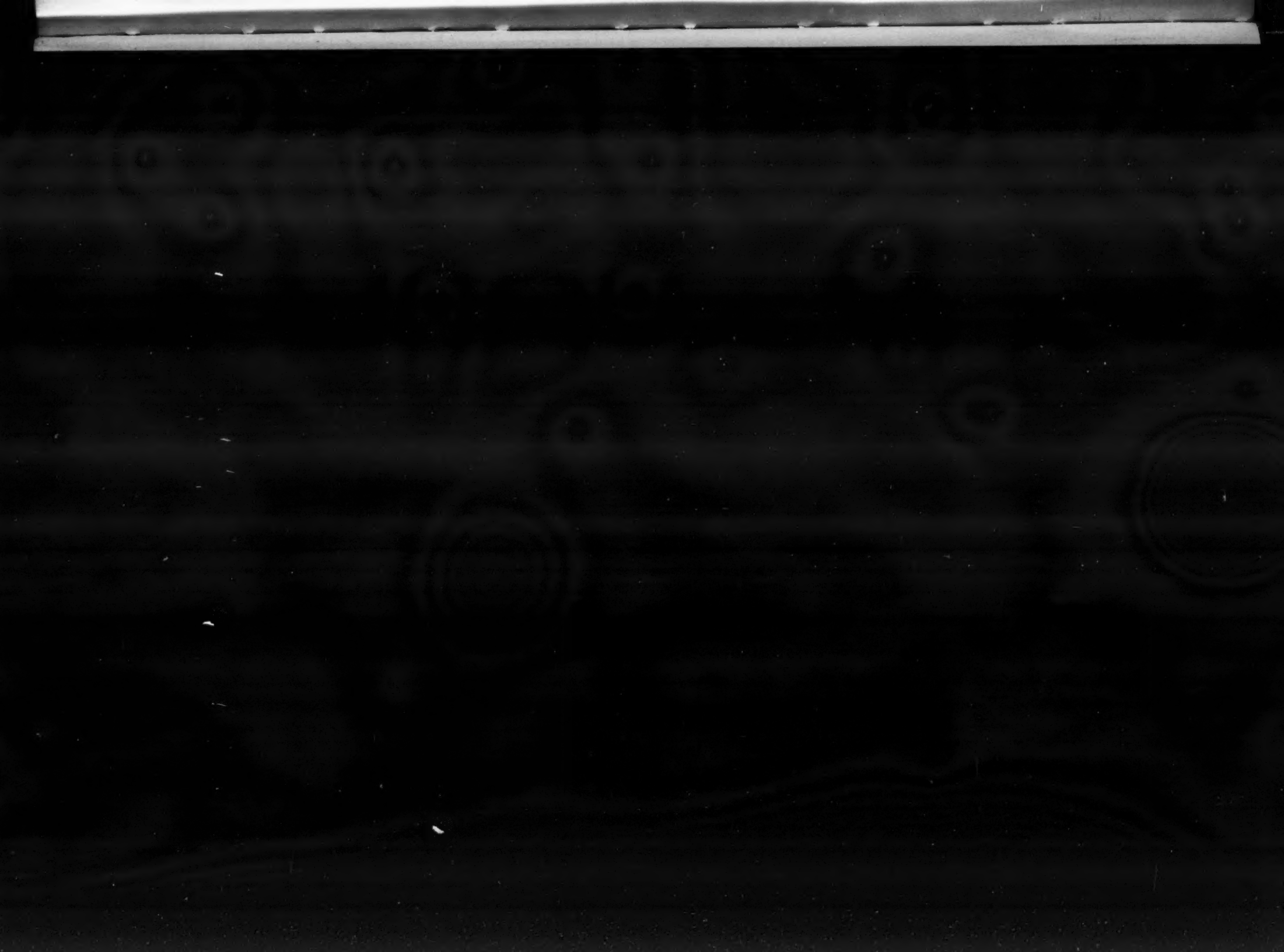
AMERICAN BEE JOURNAL

JULY 1923 $1.50 A YEAR



MR. E. SEVALLE, EDITOR OF THE OLDEST BEE MAGAZINE IN THE WORLD, L'APICULTEUR, OF PARIS, FRANCE



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League Label

The Bulletin of the American Honey Producers' League for May gives an illustration of the new League trademark. It is a circular design showing a glistening white map of North America on a gilt background. The name of the organization is given in black around the circumference and the words "Pure Honey" in red are prominently displayed.

The design is an attractive one and is adapted for use either in general advertising or is a label on honey jars and pails. Plans for using it on "Anchor" and "American" honey bottle caps are already under way and arrangements have been made with the American Can Company to supply tin pails with this design, lithographed on the lid, if there is sufficient demand. Interested beekeepers should write the American Honey Producers' League Secretary, Capitol Annex, Madison, Wis., for further information.

The League trademarks and warning posters are available only to members, but new members are always welcome. Dues for members of affiliated organizations are one dollar per year and warning posters good for two years are for sale at one dollar each.

A Good Report

The annual report of the Aberdeenshire Beekeepers' Association of Scotland, for the year 1922, is at hand. It contains about 100 pages, including several pages of advertising. It is interesting to note that in 1910 the association had but 95 members, while in 1922 there were 1,800. 1922 showed an increase of 121 members over the previous year. The treasurer's report shows a balance of more than $1,800 cash on hand after paying experts salaries, printing and incidental expenses. Probably no American beekeepers' organization can make a similar showing.

The association maintains touring experts who visit the members and assist them with their problems, much as the extension lecturers of the agricultural colleges do in this country. The association also has a number of lanterns and a large assortment of slides for loan for public lectures on beekeeping, etc. A honey show is held in connection with the flower show of the Royal Horticultural Society. A library is maintained for the use of members and much research work is done under direction of the association.

Missouri Premium List

We have received a copy of the list of premiums to be awarded at the Missouri State Fair to be held at Sedalia August 18-25 next. Mr. E. A. Schott, of Benton, is Superintendent of the Apiary Department and Prof. A. C. Burrill will judge the exhibits. A total of $500 cash is offered with first, second and third prizes in 18 classes.

VOL. LXIII—NO. 7 HAMILTON, ILL., JULY, 1923 MONTHLY, $1.50 A YEAR

RELATION OF THE SENSE OF SMELL TO THE ODORS OF FLOWERS

By John H. Lovell.

Smell and taste are very closely allied. The philosopher, Kant, called smell "taste at a distance." Smell stands guard over the entrance to the lungs or the respiratory system; and taste over the entrance to the stomach or the digestive system. Both are very useful senses and afford protection against noxious gases, liquids and solids. Smell also aids animals in finding their food, and warns them of the approach of their enemies. We are constantly confounding one with the other, as the flavor of many kinds of food, as meats, vegetables and pastries, is dependent on both senses. If the nostrils are firmly closed with the thumb and forefinger the sense of smell is shut off, and only taste remains. Then we cannot distinguish by the touch of the tongue a slice of apple from a slice of onion —both will have a sweetish taste. Castor oil loses its disagreeable flavor. Water and vanilla taste the same.

Orange peel has no taste, but an aromatic smell. Chloroform excites only taste, vanilla only smell. Substances can be tasted only when they come in contact with the organ of taste, but they can be smelled at a great distance. Ethyl alcohol can be both tasted and smelled. If the smallest quantity that can be tasted be compared with the smallest quantity that can be smelled, the sense of smell is 24,000 times stronger than the sense of taste. Substances must be in the liquid form in order to be tasted. Solids that will not dissolve in water cannot be tasted. Odorous substances pass through the nostrils in the form of gases or vapors, and it is believed that they become dissolved in the mucous on the organ of smell before they can be smelled. Thus both taste and smell in the vertebrates are excited by liquids, and both are chemical senses.

ODORS OF FLOWERS

Several articles which have recently appeared in the American Bee Journal have been prepared on special request of our readers. Not long since a subscriber wrote us requesting that we publish something on the odors of flowers. It is of interest to beekeepers to know what relation, if any, the odors of flowers have to the secretion of nectar and to what extent the odors assist the bees in finding the available supply.

We thought that our friend's suggestion was a good one and have accordingly asked the well known botanist, John H. Lovell, to take up this subject for our readers. Very little has been written about flower odors and their relation to insect visitors.

In this number appears the first of a series of articles by Mr. Lovell covering the general subject of odors of flowers.

Size of Particles Exciting Smell

The size of the particles, which excite smell, are so small that in many instances they are probably molecules.

(A molecule is the smallest particle of a substance that can exist, and yet retain its properties. If a molecule of salt be divided, sodium and chlorine, the two elements composing salt are obtained).

If scented air be passed through a long glass tube packed firmly with cotton it will still retain its odor, although the cotton will remove all particles not larger than one one hundred thousandth of an inch. A very small bit of musk will impart its peculiar odor to clothing for years, and will not for a long time lose in weight. Mercaptan, a liquid with a garlic odor, can be smelled if there is one twenty-three-millionth of a milligram in a cubic centimeter of air. A milligram equals about one-sixty-sixth of a grain. A flower may give off a strong odor for a long time, and yet consume only a small quantity of an essential oil. The odors emitted by flowers are largely volatile essential oils.

The Conditions of Smell

The organ of smell is situated at the extreme upper part of the cavities of the nose, and consists of olfactory cells and nerve-fibers covered with a watery mucous. In order that an odor may be perceived, the air must be drawn forcibly into the nose; if it is not in motion, there will be no sensation of smell. When one is asked to smell smoke the air is repeatedly snuffed into the nose. The sense of smell becomes quickly fatigued, and the odor is noticed less and less, until it fails entirely. Workers in hospitals, fish markets and fertilizer factories soon become accustomed to disagreeable odors. In about 1½ minutes one becomes unconscious of the

odor of asafoetida, and in 5 minutes of heliotrope. The sense of smell may be wholly wanting in some persons and partially absent in others. In one instance a patient could easily smell musk but could not perceive the odor of gum benzoin. Another failed to recognize the odor of verbena flowers. The smelling of a certain odor for a time may render the olfactory sense more sensitive, or less sensitive, to other odors. After smelling beeswax one becomes more sensitive to the smell of India rubber; but after smelling iodine one becomes less sensitive to the odor of heliotrope or oil of caraway. Knowledge of these facts is obviously of great importance in testing the odors of flowers.

How is the Sense of Smell Stimulated?

The English chemist, Ramsay, thought it probable that smell was produced by molecular vibrations. Very light molecules, like those of hydrogen, nitrogen and oxygen, were supposed to vibrate too rapidly to produce smell. A gas must be 15 times heavier than hydrogen to be odorous. For example, marsh gas or methane is only 8 times heavier than hydrogen, and is odorless; ethane is 15 times heavier and has a faint smell; propane is 22 times heavier and has a distinct smell, while butane, 30 times heavier, has a much stronger odor. Finally, an upper limit is reached beyond which the sense of smell is again lost.

But today it is generally held that smell in the vertebrates is a chemical sense. The minute odorous particles are carried by currents of air through the nostrils to the watery mucous covering the surface of the olfactory organ. In this it is dissolved, and the chemical reactions which take place give rise to the various sensations of odors. If a gas, as hydrogen, nitrogen, oxygen, marsh gas, water gas and carbon monoxide, does not excite chemical action, they cannot be smelled. A relation between the chemical composition of subsubstances and the sensation of smell would seem to be indicated, since a part of the alcohols and acids can be smelled, while others can not. It has been shown by experiment that odorous liquids brought in contact with the olfactory organ of man can be smelled, and in fishes only liquids can produce the odorous sensations. The different odors are due to different chemical changes.

The Distribution of Smell Among Animals

Smell has been called a land or ground sense. Invertebrate animals living in the water either do not have this sense at all, or it is very rudimentary. Fish have the organ of smell well developed, and although only liquids can come in contact with it, experiment shows that they readily perceive odors. Fishermen toll fish by casting in the water ill-smelling poggy chum, which appears to be smelled at a long distance. Water mammals, except the whalebone whale, as dolphins and seals, seem to have lost the sense of smell. Birds usually have only a feeble sense of

Fig. 3. The cardinal flower is a bird flower. It is odorless, as birds have a feeble sense of smell.

smell, since there is much less occasion for its use in the air than on the ground. It is noteworthy that bird flowers, which are usually colored a brilliant red or scarlet, are odorless, or only faintly scented, as the native cardinal flower, the most brilliant red flower in the northern flora.

Dogs, and most quadrupeds, have a stronger sense of smell than man, since the nose is brought close to the ground and is very frequently used in searching for food or in finding their way. But the keen sense of smell in the hound is largely due to training, for in many breeds of dogs it is much less strong. Statements to the effect that dogs live chiefly in a world of odors are greatly exaggerated. The Airdale is largely guided by vision, and if he loses sight of his master, instead of following his trail, will usually return home. There is little evidence that the sense of smell in man has greatly deteriorated, as is often asserted. It is sufficiently developed for his requirements, and there is no proof that it was once much stronger than it is today. The erect position of man and his ancestors has not been favorable to the high development of this sense.

Many insects have an acute sense of smell. In bees it has been conclusively shown by the experiments of K. v. Frisch, and in ants by the experiments of Forel and Wheeler that this sense is located on the antennae. Undoubtedly also in flies, butterflies, moths and beetles it is also found on the antennae. Care must be taken to distinguish carefully between the effect of irritants and that of odors, for different nerve endings are stimulated. "If we are content," says Forel, "as our predecessors have so often been, and as Graber is again, to bring close to animals

Fig. 1. The whole plant of yarrow has a strong odor. The flowers are visited by flies, beetles and wild bees, but seldom by honeybees.

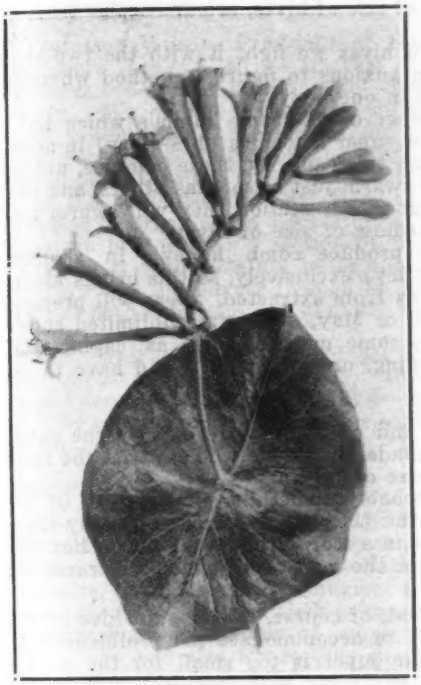

Fig. 4. The trumpet honeysuckle is an odorless bird flower. Other species are fragrant. The garden honeysuckle emits a powerful scent.

certain substances which are odorous to us and see whether they avoid them or not, we have not demonstrated olfaction at all. . . . We have simply shown that these substances have irritated the animal in one way or another." "Perris showed clearly that the experience of every entomologist who had himself observed the habits of insects with discernment should convince us of the fact that the sense of smell resided in the antennae." Honeybees probably have a stronger sense of smell than man; but, as v. Frisch has pointed out, there is no reason to attribute to them marvelous olfactory powers, as has been done by some mistaken enthusiasts. The human sense of smell can distinguish between different species of ants, and the three casts of the honeybee.

There have been published thousands of articles on the vision of animals, most of which, in the opinion of an eminent American psychologist, are valueless. Even in the bee journals there has been much discussion of the colors of flowers and their relation to the honeybee, but the significance of the odors of flowers as an allurement to bees and other insects has been almost wholly ignored. It is most desirable the beekeeper should have definite knowledge of the part played by the sense of smell in the honeybee in the field as well as in the hive. That odors are important in the economy of the colony, in the discovery of the presence or absence of the queen, in locating their home, in recognizing their friends and enemies, in uniting two colonies and introducing queens, no one questions. But we know little of the effect of floral odors on the flight and behavior of bees in the field. To what extent do they guide the workers in their search for nectar? How far can they be perceived? To what extent does the sense of smell enable the bee to determine whether a flower is nectarless or not? Even among flowers with agreeable odors the bee often shows a marked preference in its visits. Is it smell, taste, or the quality of nectar which guides it? Will the bee avoid repulsive odors, when it is for its advantage not to do so? These are some of the questions which present themselves for our consideration, and which we are able to answer very imperfectly. A more exact knowledge of the odors of flowers is necessary. And what is more illusive than these exhalations, or harder to measure? One of the first steps is the classification of odors, which will be attempted in our next paper.

Maine.

CONDITIONS IN MINNESOTA

I see by the Government report condition of bees from North Central states this spring is reported below the average. This statement is not borne out by facts, and ought to be qualified. Careless beekeepers had large winter losses and have now weak colonies at the beginning of the honey flow. Good beekeepers had no winter losses, and are forced to extract the dark apple and dandelion honey to make room for the clover crop. Good beekeepers also report colonies ready for swarming by May 15, and by May 20 all good beekeepers had their bees working full force in the first super.

With honey selling by the ton at 10 cents and some as low as 8½ cents and the cost of production at 11 cents one of the two things must happen to come out even. The cost of production must be decreased by better beekeeping, which means producing more honey per colony, which again means young queens, late brood rearing in the fall, forty-five pounds of pure honey and syrup for winter food, constant temperature of not less than 48 degrees F. during winter in a quiet cellar, keeping bees in cellar till nectar and pollen are available and giving them the proper breeding space during spring. In other words, keep the colonies strong—very strong—throughout the year.

Or the price of honey must be increased by organization of beekeepers and production of a better quality of honey, which means clear, white honey which the market demands.

So much to come out even. But if profit in beekeeping is desired, we have to do both: decrease the cost of production and increase the price.

In the meantime the condition of bees with good beekeepers in Minnesota in the spring of 1923, as compared with the spring of 1922, are at least 250 per cent above the average They are the men and women who read the papers, study the bulletins, attend short courses and have mastered in a practical way the latest research work in wintering, swarm control and other essential points of rational management.

Francis Jager.

Fig. 5. Flowers of the begonia are without odor.

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THE EDITORS' VIEWPOINTS

DEDICATION OF MILLER MEMORIAL LIBRARY

Professor Wilson is very anxious to have the above meeting well advertised, for it should be the greatest meeting of beekeepers the United States ever had. It will take place at Madison, Wis., beginning August 13, and will end at Marengo, Ill., at the home of Dr. Miller, August 18, with dedication of a bronze tablet inscribed to his name, at the church to which he belonged.

Many leaders in American beekeeping expect to be present. A. C. Miller, who donated his extensive library, will be there and so will Professor Jager, Phillips, Demuth, Rea, E. R. Root, Colin P. Campbell, France, etc., also Judge Grimm, son of Adam Grimm who was one of the first importers of bees and owned large apiaries. We will also try to get Mrs. C. C. Miller there. The program will be published in August and may be had by addressing Professor Wilson, at the University of Wisconsin, Madison. Let every beekeeper try to come who can.

HOW THE SWARM HANGS TO THE LIMB

The Belgian magazine, "L'Abeille & Sa Culture," in its May number, gives a detailed statement, taken from the Algerian "Nahhla," on the method used by the bees to hang to limbs. The weight of the swarm is sometimes several pounds and it requires quite a little strength on the part of the bees which are at the top of the cluster and sustain the weight of the rest.

The feet of bees are provided with two different organs for this purpose. The pulvillus or empodium is a moistened cushion or pad, called by Cowan "a fleshy lobule, which gives out a glutinous secretion and causes it to adhere to a smooth surface." This organ, described similarly by Cowan, Snodgrass, Phillips and others, acts as a sucker, the atmospheric pressure and the glutinous substance, which it secretes, preventing it from dropping off the surface to which it clings. But there are also two claws working together, which cling to any rough surface and probably act without any effort on the part of the bee when it is hanging to the limb of a tree and bearing the weight of a great number of others. Those who have taken bees off a rough surface, especially when heavily loaded with others, have noticed that it takes a little effort to sweep them away from the surface to which they hang. The article above mentioned states that, according to scientific calculations, ten worker bees, each hanging by its six legs, could sustain a weight of a kilogram, or 2.2 pounds.

SWARM CONTROL

The following letter from a North Carolina reader reached the editor in May. Since the problem is similar to that raised by others, the answer is given here:

> "I have been interested in Dadant hives for next season and, so far, have been unable to quite clearly figure out a method for our location, which in every respect is different from yours, as this section is very conducive to swarming, owing to early brood rearing and divided flora; some manipulation has to be resorted to, regardless of size of hives, at our regular swarming season.
>
> "With standard hives we fight it with the two-hive method, but I am anxious to figure a method whereby it can be handled in one body.
>
> "I have a number of 10-frame jumbos which have run with a shallow super of combs (1½-story) in addition and, even with this capacity, these colonies, unless manipulated, will swarm just as soon as others, and our specialist says that in our section they will swarm unless treated, regardless of size of hives.
>
> "Now we also produce comb honey, in shallow frames (chunk honey) exclusively, so this brings about different conditions from extracted. Bees will prepare to swarm in April or May, even after unlimited super room is given, so some method such as caging the queen, or requeening, or something would have to be done."

Your statements and arguments are exactly the same as those given in Canada, by people who say that the bees will swarm in any size of hive.

Well, there is probably something in the rush of an early flow to cause the bees to swarm more readily than when the flow comes in a more gradual manner. But the size of the hive is not the only thing which will cause or prevent swarming.

It is well understood, of course, that if your hive brood chamber is too small to accommodate the prolificness of the queen, or if your super is too small for the active force of gatherers, swarming will result. But these causes are not the only ones to induce swarming, whether you are in Carolina, or Illinois, or Quebec.

Bees have a natural tendency to swarm, whenever the busy season comes. It is for us to find what causes increase that tendency and what decrease it. To expect absolute swarm prevention is unreasonable; but we should watch and prevent all things which tend to make the bees rear queen cells and leave.

The methods of spreading the brood, putting it in upper stories, removing queens, removing queen cells, are all too laborious to be practiced on a large scale.

But there are things which are advisable in any case. Here they are:

The brood chamber should be in one apartment, so the queen may not have to go up into another and again come down.

The supers should be in sufficient number and easily available and easily ventilated.

The queen should be less than 2 years old, so the bees will not prepare queen cells to supersede her.

There should be a limited number of drones, two or three thousand drones increase the heat in a hive considerably, besides being in the way of the workers in the warm hours of the day.

There should be shade over the hive, so the temperature may be readily kept down below blood heat.

There should be easy means of ventilation, by an entrance made adequate to the population and by comb spacing that will enable the bees to force air readily through the hives, up into the supers and down again. In this, the Modified Dadant and standard Dadant hives are ahead of the Jumbo or the standard Langstroth, having one-eighth inch more between combs, or some 180 additional inches of breathing space.

Swarming may be kept down quite readily in 95 per cent of the cases if the above conditions are complied with, in any style of hive; but we know by actual experience upon hundreds of hives that it is easier to control it in the large brood chambers than in several small ones.

SMOKING THE BEES DOWN FROM THE SUPER

If the combs are sealed, it will not be difficult to smoke the bees down. But if they are partly unsealed, not only will it be more difficult to smoke the bees down, but it may also taint the honey with a very perceptible taste of smoke. Better use the bee escape as regularly as possible. It pays to have escapes at each apiary, to help in the removal of the supers when they are full.

SHORT WEIGHT

Professor Wilson, President of the American Honey Producers' League, writes us that a number of pound packages ordered by him from the South arrived short in weight. We do not believe the shipper meant to make short weights, but he evidently did not realize that the bees would lose weight on the way. Pound packages should be full weight on arrival at destination.

At the suggestion of Mr. Demuth, Professor Wilson proposes to organize an association of shippers as well as of queen breeders, as a section of the Honey Producers' League. It will certainly be to the benefit of both the shippers and the buyers if such an association is organized, as both sides will feel that the other side tries to be fair.

The conference upon this subject is to be called during the proposed Chautauqua week. Breeders and shippers should write Professor H. F. Wilson, at Madison, Wis., to offer suggestions as to arrangements and date. There should be a monster meeting.

CO-OPERATION

The May number of the World's Work has an article on "True Farmer Co-operation," by Aaron Sapiro, which is worth reading. It does not tell the beekeepers how to organize, but it describes a number of farmers' organizations, their failures and their successes. It shows where farmers lost large sums of money in mismanaged co-operations, and also where they succeeded and are likely to continue succeeding. It explains how different conditions must be met by different methods. It puts the question in comprehensive form by citing examples.

"There are all types of co-operative organizations today, in the world, that are worth real attention. One is the so-called co-operative marketing movement, which is a **producer's** movement. The other is a co-operative buying movement, which is a **consumer's** movement."

It quotes the wheat growers' co-operation, the potato producers, the egg producers, the tobacco growers, the numerous fruit growers' associations in California.

"There are all kinds of industries, there are all kinds of problems in each. There are things so different that one wonders if there are any really fundamental problems that you can apply to tobacco, as well as to strawberries and beans. There are."

It is for the beekeepers to find just how to organize in order to secure a fair price for their product. Can they do it? Certainly. They have done it. They are doing it still. It is a vital question for the commercial producer.

Look at the Colorado Honey Producers' Association, the Texas Honey Producers. They have probably not reached perfection, for there is no such thing as perfection. But they have saved some money for their members. If there are faults in such organizations, we must remember that there are faults everywhere. They must be studied and the best possible methods applied.

Above all things, when organizing, it is indispensable to have capable and devoted men at the head of these things, men who are not just looking how big a pile they can make for themselves, but how they can help themselves by helping others.

Bear in mind that the manufacturers and dealers in bee supplies are interested also in successful co-operative beekeepers' organizations, for it is much more satisfactory to sell goods in large lots to an association, than to retail them out to individuals, especially when the goods have to be shipped a long distance.

Co-operation is in the wind. It is progress. "United we stand, divided we fall." This is true of individuals as well as of federations of states such as our great country. If the states of Europe could be federated, it would put an end to wars. But they have hated each other so long that it will take centuries to make them see things in a different light.

IOWA LOCAL MEETINGS

Owing to that indefatigable extension man, Newman I. Lyle, five meetings were held during the month of June, one of which was in connection with the Nebraska Association at Omaha. The editor attended them all.

Mr. Lyle is to leave the service of the State of Iowa very soon, to attend to his own bees. Although we cannot blame him for doing this, we cannot fail to regret his departure from the work of demonstration apiaries. We hope the man in charge of extension in Iowa will select as good a man as he is, though this will be difficult to do.

The evidence gathered at all the meetings, that there is considerable foulbrood, scattered throughout the state, makes it very urgent to have concerted action. Singly, the beekeepers are practically helpless against foulbrood. Co-operation is indispensable. If it is delayed, it will delay the progress of beekeeping in one of the best states of the Union. Traveling through Iowa shows the state's immense resources, nearly every foot of its land being available for crops and many of its weeds being honey producers. Sweet clover is gaining ground and will soon be used everywhere as a soil rebuilder.

It is out of the question to go into details on the meetings held. A few things, however, stand out conspicuously. Large hives hold the day. All who use 8-frame Langstroth hives either double them or use an additional half story for the early breeding. The beekeepers now under stand that they cannot expect the best crops possible unless the queens have been given all the room they can fill with brood before the crop and during its first part.

A visit with a veteran beekeeper of forty years, Mr. Roland Sherburne, of Lone Tree, divulged the fact that a man may be a successful beekeeper with closed-end frames. Mr. Sherburne makes his own hives, for he is an excellent carpenter. They are all so very exactly made that those closed-end frames may be easily managed by him, in spite of propolis. He uses a half story for brood in the early part of the season, in addition to the full story of the regular brood chamber. This is being done quite often by the men who realize that the ten-frame Langstroth hive is too small for good breeding queens and that two full stories are too large. The difficulty is not in breeding for extracted honey but in trying to produce comb honey. I believe the story-and-a-half comes nearest to solving the problem, when the deep frame is not used.

Shade for Summer. I see that many beekeepers begin to realize that the heat of the sun of our Middle States helps to cause much natural swarming, for many are now using a movable roof on top of the hives. Did you ever ascertain how hot the sun makes your hive tops? A piece of comb will readily melt when laid on a hive, in the sun, in June and July. No wonder that the bees feel uncomfortable under that heat.

The tendency is not to keep queens longer than 2 years. If we change the queens in August, they will do, if prolific, for two spring seasons, to be again changed at the end of the second.

We are told that large hives make queens lose their fertility earlier than those that are confined in small hives. But I have never seen a good queen lose her fertility in less than two years in our large hives, and all enquiries show that this is the case generally. A good queen is good for at least two seasons of breeding.

OBITUARY

One of the noted beekeepers of the East, Mr. A. C. Miller, died suddenly of heart trouble, June 11th, at his home in Providence, Rhode Island.

A. C. Miller was a generous-hearted man, as was evidenced by his gift of a library of bee books worth, it is said, over a thousand dollars, to the Miller Memorial Library. He was past middle age and had been one of the influential leaders in beekeeping, since 1900, although there were occasional articles from his pen as early as 1887. He was one of the few contributors to magazines whose writings needed no corrections, as far as language was considered.

Mr. Miller was the promulgator of the "smoke introduction of queens," first advised by Alley in 1885. He described it minutely and it has proved efficient when the directions are closely followed.

A. C. Miller had promised to attend the dedication of the Miller Library, and the beekeepers of the country will be sorry to learn of his demise, for they will miss him there.

EVERY STEP IN MOVING BEES

Precautions that are Necessary to Insure Safety in Transportation of Full Colonies by Auto or Rail

By Frank C. Pellett.

THE novice finds difficulty in moving his bees, no matter how short the distance, and disaster often attends the first attempt. Even beekeepers of long experience frequently have heavy losses in handling a large number of colonies in extremely hot weather. While experience is the only guide under usual conditions, there are some general statements which may be useful to those of limited experience.

The common practice among beekeepers in many localities requires that bees be moved at frequent intervals. Some California beemen follow a regular system of moving to a new location at the close of each important honeyflow. In the east migratory beekeeping is less common, although there are many who move a portion of their bees to some promising location for short periods.

Moving a Short Distance

There are many enquiries from beginners as to the best way to move a single colony for a short distance. The uninitiated often find great difficulty in moving bees to a new location not far from the former one and getting the bees to stay. I well remember when a beekeeper of my acquaintance sold a fine colony of bees at a fancy price to a neighbor living at a distance of about a mile. As soon as the bees were taken away he prepared a new hive with drawn combs, a frame of brood and a queen and placed it where the colony had stood. The following day most of the working force returned and, to all appearance, he had as good a colony of bees as before, and the money beside. The purchaser, not being familiar with the habits of the insects, had taken no precautions to insure that they would mark their new location. When a swarm issues the bees may be placed in a new hive and placed anywhere the beekeeper chooses, with no danger of the bees returning to the old stand. In moving them to a greater distance than the ordinary daily flight there is, of course, no difficulty, but for short distances it is necessary to create such an abnormal condition that the bees will mark the new location as carefully as they do after swarming.

If the bees are to be moved but a few rods, as across the yard or across a city lot, it is usually easiest to move the hive a few inches each day, and thus make the change so gradual that there is no serious confusion. If no other hives are near, the bees may be moved farther each day than is possible in an apiary where there are many hives near together. If a hive is moved as much as three feet there will be great confusion among the bees for a time, even though no other hives are close by. If others are near there is likely to be much drifting into hives nearest to the site where the hive stood.

To move the bees distances of from a few hundred feet to a mile or two it is necessary to take some extra trouble: If they can be moved in late fall or early winter, when they are likely to be confined for some time without a flight, there will be less trouble about returning to the old stand.

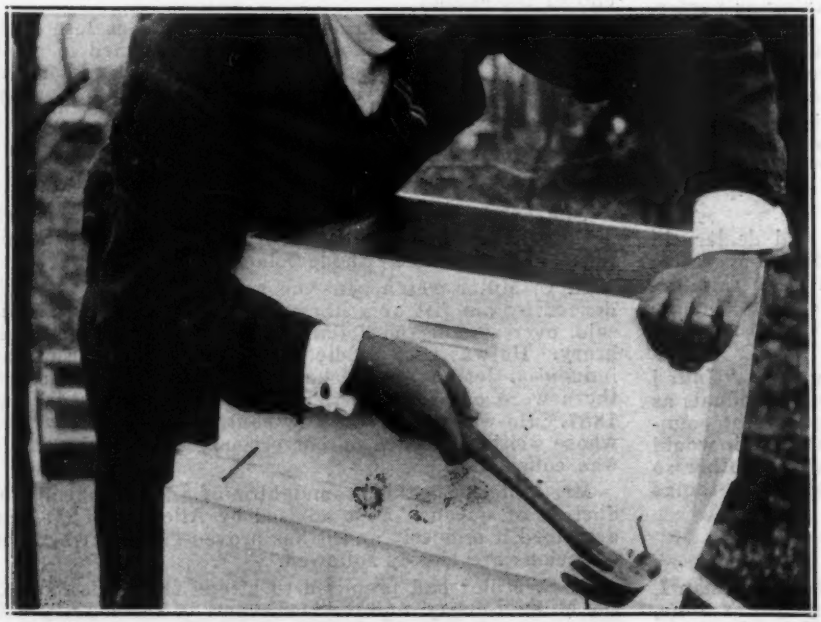


Fig. 1. Staples should slant somewhat to prevent slipping of the bottom board.

Fig. 2. Details of moving screen construction.

However, it often happens that when bees are taken from the cellar after several months confinement many of them will return to the location occupied by the hive the previous fall.

In moving short distances in summer it is usually best to take up the hive at night after the bees are all in and place it in a dark cellar for a day or two. It can then be taken out in the early morning and when placed in the new situation a little jarring of the hive will serve to excite the bees. A wide board leaned against the front of the hive or a large box turned over it, a board being pried off to permit the light to enter and the bees to fly, will serve to make the new surroundings appear so very different that the bees will more readily mark the location. At best there will be some bees which will return to the old location and it is well to have an empty hive there in which they may cluster and be returned to the new location again in the evening.

Preparation for Long Moves

For a short move no special preparation is necessary, since the bees are confined but a few minutes. For long moves several things must be looked after. Provision must be made to avoid smothering of the bees, breaking of the combs or permitting the bees to escape while on the way. The amount of care necessary will depend largely upon the distance to be traveled and the manner of transportation. If the hives are to be submitted to rough handling for a long distance as is often necessary when hauling by truck over a rough road or shipping by rail, it is wise to see that no more honey is left in the hive than is needed for the journey. Heavy combs of honey, especially combs insecurely wired, are likely to be broken down in transit and the bees messed up and killed in the slush. Ex-

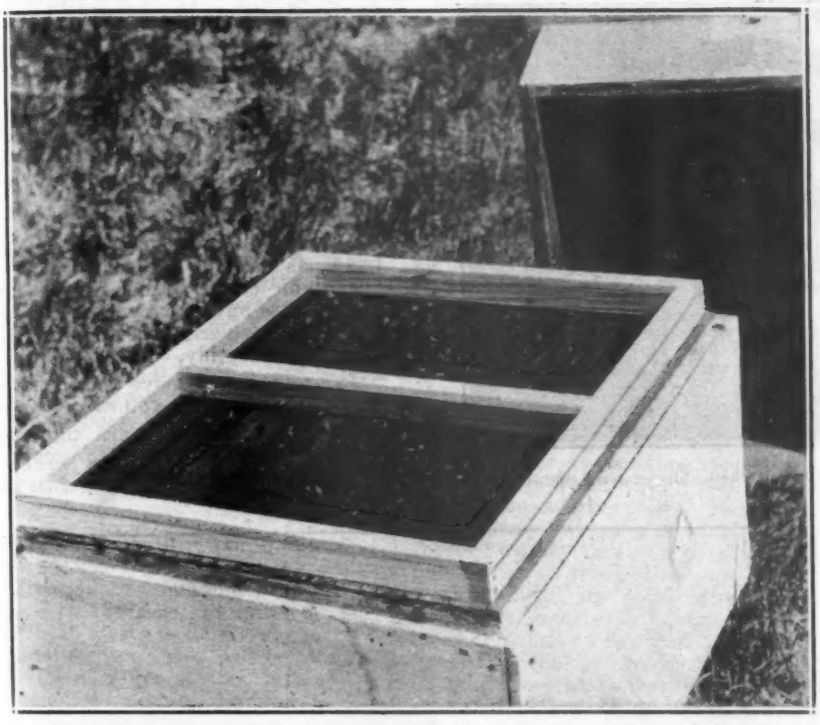


Fig. 3. Moving screen in place over the brood frames of a double-walled hive.

tra combs of honey can be replaced with dry drawn combs on which the bees may ride much more safely.

Fastening the Hive

The bottom board must be securely fastened to the hive body. The usual method is by means of staples, as shown in figure 1. Wide staples should be used and those at the front and back should be slanted in opposite directions to prevent slipping of the bottom. At least two staples should be used on each side and one at the back. For long distances three should be used at each side and two at the back to make sure that they will not work loose. For rail shipments it is better to nail the bottom and not trust to staples.

Securing the frames is the next important step. If Hoffman self-spacing frames are used they can be crowded tightly to one side and a wad of newspaper crowded between the outside frame and the wall of the hive. This will prevent swinging of the frames sidewise. If loose hanging frames are used it will be necessary to crowd wads of paper between the ends of all the frames to retain the normal spacing. This can readily be done with little danger. I have moved a truck load of bees 75 miles with paper between the loose-hanging frames in this manner without breaking a single comb. It is a tedious job to fasten a large number of frames in this manner, but it must be done carefully if the bees are to go through safely. When the frames are fastened to prevent swinging a quarter-inch strip should be placed across the tops at each end. This strip should be just long enough to fit down tight crosswise inside the hive. A single nail in the center, or one at each end, can be driven into the end of the hive to hold it securely and prevent the frames from lifting upward when the hive is jolted. Properly fastened, the hives will stand a surprising amount of rough treatment without injury to the combs. Old brood combs should be used as far as possible, since new and tender combs will not stand as much hard usage.

Moving Screens

It is very important to provide sufficient clustering space above the combs to prevent the bees from smothering. Figure 2 shows the method of constructing a moving screen. It should be at least two inches deep. Shallow screens may serve in cool weather, but a strong colony of bees generates a surprising amount of heat when they are excited. In hot weather I have seen the bees crowd against the screen so closely as to leave no chance for those below to get air, with the result that most of the bees were smothered and the combs melted down, although the entire top was exposed. This seldom occurs where the screen is made deep enough to provide ample clustering space above the frames. Figure 3 shows a moving screen in place over the hive. If the screens are the right size to come flush with the outside of the hive they can be fastened with staples, as the bottoms are fastened in figure 1. Otherwise they must be fastened with nails driven downward into the hive body, as shown in illustration. If the weather is very hot and there is much brood in the hives it is sometimes necessary to screen the bottom as well as the tops of the hives to provide sufficient ventilation.

All this preparation should be made the day before the move is to be made, with the entrance left open to permit the bees to fly as usual. At night when all the bees are in, the entrances should be closed with strips of lath.

Loading the Bees

It is a simple matter to load the bees into a freight car when only a small number are to be shipped. Figure 4 shows a single tier of hives ready for a journey of less than 24 hours. The strips had not yet been placed which secured the hives to the car and made it impossible to shift them about when the car was bumped by the switch engine. It is important that hives be placed with frames running endwise of the car, as all jars are received endwise in a freight car.

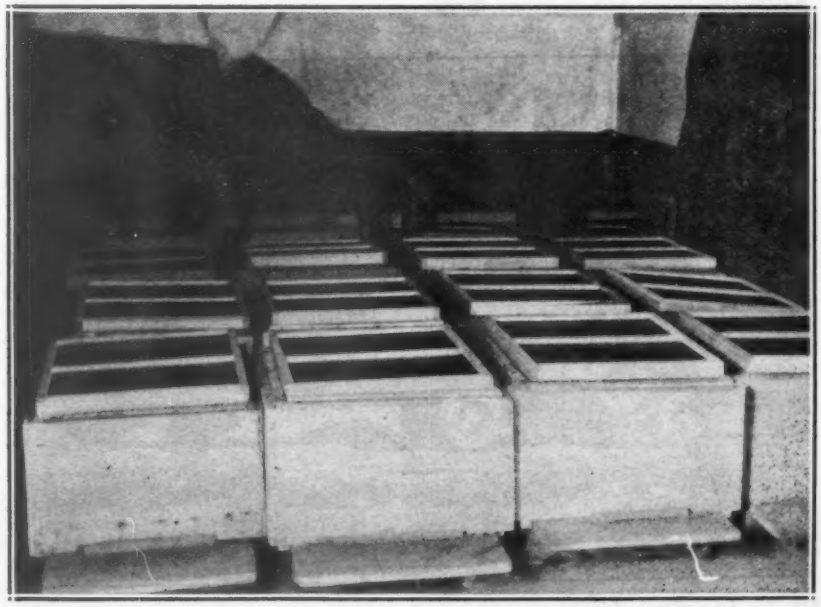


Fig. 4. Hives should be placed in freight car with frames running lengthwise of car, since jars are endwise.

Fig. 5. Bees must be provided with ample ventilation when shipped long distances by rail.

Figure 5 shows the method of placing several tiers of hives one above another in a car for long distance shipping. A freight or box car is good for shipment when the bees need not be on the way for more than two days. For a longer period, those who have had experience advocate an iced refrigerator car. The low temperature causes the bees to cluster and keeps them quiet when they would otherwise be very restless. Where the bees are in transit for several days in an ordinary car they are likely to consume a considerable quantity of honey. C. S. Engle, after shipping a car of bees from Texas to Iowa stated that at least 20 pounds per colony is necessary to insure safety. Provision should be made to feed the bees on arrival, in case any colonies are needy and no honey is coming in from the field.

Considering the present high freight rates it does not pay to ship carlots of full colonies for long distances. It is cheaper to ship bees in packages or nuclei and place them on combs on arrival.

After the hives are in place strips should be used to nail them solid and insure that they cannot work loose.

Use of the Truck

For distances of less than 100 miles, and often for longer distances, it is usually cheaper and more satisfactory to move by auto truck. The hives should be so placed that the frames should stand crosswise of the truck, as most of the jar on a truck or wagon comes from side jolting. It is well to have someone on the load beside the driver to see that the load is riding smoothly.

In preparing to move bees it is well to make sure of the following:

1. That the hives are tight and will not permit any bees to escape.
2. That the frames are fastened securely to prevent unnecessary jar or breaking of combs.
3. That sufficient ventilation has been provided to avoid smothering of the bees.
4. That sufficient stores are present for the journey but that safety is provided by replacing heavy combs of honey with combs containing not more than two pounds, and that only old and well wired combs are used.

Fig. 6. Hives should be loaded on truck or wagon with combs running crosswise, since jars are mostly sidewise.

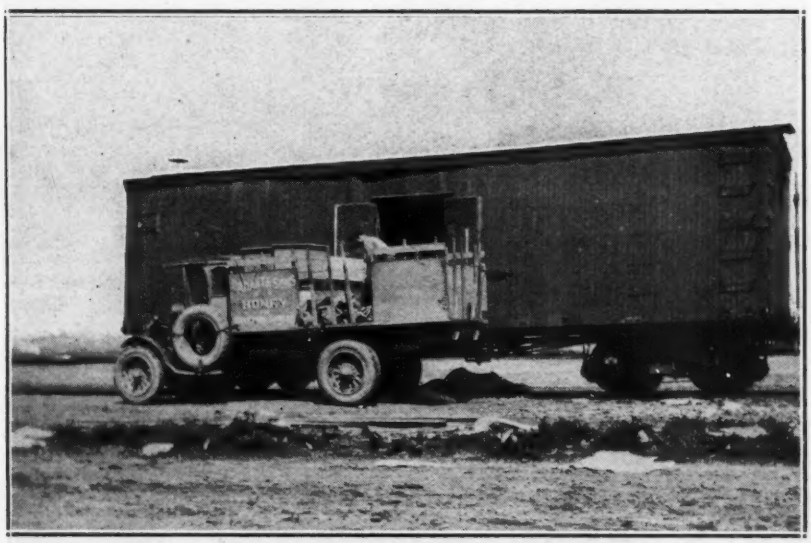


Fig. 7. An ordinary freight car will serve for shipping when bees are not on the way more than two days in cool weather.

More Patents

The appliances designed for beekeepers are endless. The latest patents issued include a feed box used in combination with a hive having an aperture in one of its walls. So many devices for feeding have been offered that it seems there was no possible addition to the number. Biagio Troilo, of Oneida, New York, however, has figured out a new way to feed.

George W. Spikes, of Dalworth Park, Texas, has recently been granted a patent on an ornamental design for a honey receptacle.

CHINESE BEES AS WE FIND THEM

By Edward J. Blandford.

WHEN writing about the Chinese bees, it would be better to qualify our remarks by adding the word "Provincial."

Some of the things printed in the bee journals on Chinese bees do not agree with our experience in **Central** China. China is a large country, and bees in different localities may differ, especially when found one thousand miles one from the other.

It is now about five, or six years since we started with a very small colony of bees, which we found comfortably nestling on the walls of our bungalow, which had been closed up for the winter, on the mountains of Kuling.

Kuling is more than 3,000 feet above sea level, situated on the Yangtsi River, about 500 miles from the coast, Lat.. 29 deg.. 11 min., 40 sec; Long. 116 deg., 0 min., 54 sec.

I am sending you a few photos, that you may get a view of some of our colonies in our gardens at Happy Land and Lake View. Since starting beekeeping we have had so many things to learn! Chinese bees do not take readily to our western innovations. The Chinese tell us that their bees have never "studied books," and are not able to follow our instructions. However, by persevering, we have gradually improved our stock, and, as the Chinese say, "educated" them to do what we want them to do(?)

We have taught them to do less swarming, to settle down to rearing brood, and to go "upstairs" to store honey. Our bees work fairly well here in the plains, on the shores of the Poyang Lake. They are on the wing nearly every day of the year; hot or cold, they are always going; in fact, they "go" too much, eat all the honey they gather, and wear themselves out. If not by fair means, then by foul (robbing), they must bring something home.

Our queens are at work every month in the year, with the exception of, perhaps part of July and August, when the heat compels them to rest. No honey is sealed during these months, and very little during the month of June. The humidity in the air prevents it, I suppose.

It is a mistake to suppose that Chinese bees do not sting. Don't you believe it! Only yesterday I received a post card from one of our lady missionary workers, saying that one afternoon, when dividing a colony, she got only thirty-seven stings on her legs and ankles. Often when opening our hives, the bees will dart out at you, and the moment they touch you, you are stung; but like the late dear old veteran, Dr. Miller, we only cry out with the pain when no one is near to hear—but we are stung just the same.

In comparing notes, we consider the Chinese bees equally as easy to handle as the European bees. Apart from stings spoken of above, we can manage them without smoke or veil, and when driving them even go so far as to take them up in our hands and move them from place to place, but once they are upset, the only thing to do is to drop the hive and run.

The bees in this Province, when about to swarm, know how to build queen cells. I have counted as many as twenty-seven capped queen cells in one tub (a skep). When superseding the queen, it is rare to find more than three or four at one time, sometimes only one. When they lose their queen the workers are the most rabid drone-layers you could wish for. Two or three days after the queen leaves them, they will go to work and fill up comb after comb with eggs, some cells having as many as four or more eggs in each. Just lately I opened a hive which had lost its queen not more than ten days before, and it had six combs filled with eggs. I did not stop to count them, but there must have been a dozen eggs in some cells. It is waste of time to attempt to introduce a queen to a drone-laying colony. You may succeed now and again, but the chances are against you. Break up the colony and divide the bees among other colonies is the best plan.

Speaking of drones: In some Chinese tubs purchased direct from the Chinese, I have often found as much drone brood as worker. Thousands and thousands of drones fill up these Chinese tubs. The bees are very slow to turn their drones out, allowing them, in some cases, to remain in the hive through the winter. If the Chinese bees have a certain time for turning the drones out of the hives, I have yet to see them do it. Early or late, everything seems to depend on the honey flow.

I once purchased a tub of bees up country and had it placed on the table in the cabin of my boat, with a cloth over the mouth of the tub, for the night. It was in the month of November. All that evening, and far into the night, I heard a rather lively entertainment going on inside the hive. In the morning, on lifting the tub to get a peep, I found that hundreds of drones had been slain, and were lying dead on the cloth.

Sometimes we have been asked by the Chinese to examine a tub of bees to find out why they did not "make honey," and have found three times as many drones as bees. To tell the Chinese that the drones are useless, that they do not "make honey," is to appear to them as ignorant, indeed!

Chinese bees are great swarmers, and if left to themselves they simply live to swarm. The prime swarm that comes out often swarms again the same season, and no matter how much room they have in the hive, if the season is favorable, swarm they must. We have had them swarm from a 10-frame Langstroth hive with only five frames of brood and honey, leaving eight or ten queen cells behind them when they go.

Sometimes we find the queens are able to fly as soon as they leave their cells. On one occasion I was busy cutting out some queen cells. I had removed four cells from the comb, and placed them on top of another hive. I had two more in my hand, and was working as fast as I knew how. The two in my hand had come out first, and before I could lay hold of the others, four of the five were out also, two of which escaped, and I never saw them again. They made one straight line for the south and disappeared. Maybe the caps were broken before I removed them from the hive, but the worker bees had held them at bay, and as soon as they found the way open, out they came.

Here is an experience I had not long ago: One of our tubs started to swarm and threw off swarm after swarm, until there were but very few bees left in the hive. I then started to drive the bees out of this tnb and was surprised to find still seven more beautiful queens inside. Thinking the tub was now empty, I cut out all the combs, knocking the hive on the ground three or four times, and then put it aside in the open until the next day, first covering the top with a piece of sacking. The next morning I went to look and noticed about ten or twenty bees on a piece of comb in the bottom of the tub. I took these out in my hand, and, to my astonishment, here was another very fine queen; but the moment I touched her she stretched out her legs and appeared to be dead. I stroked her wings with my finger and then laid her out in the sun, moving her from side to side, but saw no signs of life at all. Ten minutes later I picked her up and laid her on the alighting board of another hive. About a dozen bees came out and began to play with her, when suddenly she pulled herself together, stretched out her wings, and commenced to run across the alighting board towards the entrance of the hive. I picked her up at once and just closed my hand in time to save her making away. That queen today, after her strange behavior, heads one of the strongest Chinese colonies we have. Is this a case of catalepsy, sometimes found in queens?

We have only tried clipping the wings of one or two queens, and have decided not to do it again with Chinese bees. It takes us all our time running about the garden hunting for queens that have their wings clipped. Either they are so disgusted with their general appearance and leave the hive themselves, or are driven out by the bees; anyhow, the thing does not seem to succeed.

To cite one case in particular: In a baby nucleus of about two to three hundred bees, we placed a rather good queen. All went on well for a few days, when suddenly her ladyship became disgusted and swarmed out of

the hive, with every bee following her. We put her back, but after a few hours, out she came again, and again, the third time, she did the same thing. Then a friend suggested clipping her wings, which we did. The second morning, on examining the hive, I found the bees there, but the queen missing, and nothing more was seen of her for a few days. In a second row of hives, a little way down the hill, and away to the right, we had a queenless colony, with six frames of bees and brood, and ten queen cells. One morning, on opening the hive, to my horror, I found that all the queen cells had been destroyed, and this two days before the queens were due to come out. On further examination, I found a queen and, would you believe it? here was my missing lady with her clipped wings- She had made her way from the baby hive, down the hill, up the bank, onto the alighting board, and into this hive, and like a warrior, had destroyed everything that hindered her from reigning supreme! Well, I decided to leave her pro tem, and see what would happen. Two days later, as I was passing the hive, I saw her making her exit from the front entrance, and off down the hill she went. I picked her up, stroked her poor clipped wings, and put her back in the hive again. That was the last we saw of her. How soon after this she made her escape and down the hill to destruction, I cannot say.

China.

WAX RENDERING

By C. P. Dadant

THE short editorial on page 287 of the June number has called for more information on the rendering of old combs and on wax rendering in general, in a large apiary.

When the average beekeeper is told to buy a Hershiser wax press, because it is the best to render up old combs, he demurs, for he does not like to put so much money in an implement to be used only once or twice a year. Well, wax may be rendered with less expensive machinery, but it takes some ingenuity.

For years, before the invention of the wax press, we rendered the wax from our old combs with an ordinary wash boiler. But let me say, right here, that if you try to use your wife's wash boiler for the purpose, you may at once make up your mind that she will demand another boiler; for nothing is more difficult to remove from tin than a light coating of beeswax. The wife should have a new wash boiler, if not an electric washing machine. But an old wash boiler is good enough to use in rendering wax, if it does not leak.

Old combs, drone combs, crooked combs, and all wax scraps should be well soaked in water before trying to render the wax. A solar extractor is about the worst thing you can use to render up old combs, for they are so full of foreign matter, as stated in the editorial on page 287, that nearly all the wax contained in them will be absorbed.

First, crush the old combs, for the following reason: The cells are lined with cocoons of hatching bees, and when the wax melts, some of it is sure to lodge into those cocoons, and it is impossible to get it out. If you crush the combs, you will flatten those cells and they will not fill with liquid wax.

To soak the combs thoroughly, put them in an old gunny sack, in a tub, and cover them with stones sufficiently to prevent their floating. Use soft water, rain water, because hard water may contain some iron, which will help to darken the wax. We always get bright yellow wax out of the darkest combs, if the work in done right. Of course, it will be of a deeper yellow tint than cappings, but light enough in color to sell well.

Let the combs soak for two or three days. When you remove them from the water, you will notice that this water has become very dirty. It is just that much dirt already removed. When you are ready to render the combs, put plenty of water in the boiler and sink the combs in it. Some people prefer to leave them in the gunny sack and let the wax ooze through. We prefer to have them loose in the water so as to stir and heat all parts thoroughly. Do not make a big fire and leave the mess without attention, for you may find your wax boiling over on the stove. If you boil the stuff too long, you may find that the steam produced has disintegrated the wax, which will then refuse to come together in a cake, but will cool in small grains like coarse corn meal. When the beeswax is in that condition, the only thing that will bring it together again is dry heat.

Do not use an iron kettle to melt wax in, unless it is bright and shiny. Rust or dark iron will make beeswax dark. Some people use salt water to render wax, but that is simply because the water is then heavier and the wax floats much more readily. But the disadvantage of salt in the water is that it is likely to rust the vessels used if there is any iron exposed to the action of the salt.

If you have kept your combs in a sack to boil out the wax, you should stir that sack slightly from time to time, holding it below the surface of the water all the while, so that the beeswax may rise to the top. Then use some slightly flaring vessels in which you pour the wax as you remove it from the top of the mixture, with a ladle.

If you have followed our method and have the wax freely floating in the boiler, make a sort of basket out of wire fly screen, just large enough to dip your ladle, and fasten this at the top of the boiler. As the wax flows into this screen, dip it out. You will lift some residue with it, but it matters little, for we need to melt the wax a second time to purify it.

If you do the job right, you will secure almost all the wax without needing any press. If there is a little left at the top of the residue, when you quit, set that aside to be used with the next batch. A well moistened, well crushed lot of old combs will retain but very little wax after this melting.

If a wash boiler is too small for your purpose, have a boiler made which will be of sufficient size.

If you use a Hershiser press, or any sort of wax press, you should nevertheless crush the combs and soak them well before rendering. You will secure just so much more wax, and cleaner. An old Hershiser press which has been allowed to rust will produce just so much darker wax in proportion to the amount of rust that it shows. Our people, who use a dozen or so of those presses, often have darker wax than they ought to get, because of the rust in the presses.

Recipients for hot wax should all be flaring and made of either tin or tinned copper. We use copper altogether, because it is cheaper in the long run; as the tin receptacles last but a short time before having leaks in them; while copper cans last just as long as they are not too much battered by handling; when they are unfit for further use the copper in them still has a value.

Solar extractors are good for small bits of wax, braces and bridges cut from the combs as we work at the bees. Some people I know are in the habit of dropping those bits of wax (wax and propolis) to the ground. Then on warm days when the sun shines on them, in July and August, this refuse sticks to your shoes and you are likely to bring it into the house and stick it onto the rugs or on the clean kitchen floor; then you will hear from the housekeeper. I don't blame her. You should save all those bits of wax and put them in the solar extractor. The wax will separate from the propolis without any difficulty.

However, whether your wax is melted in the solar extractor, or in the boiler, or in a wax extractor, it is necessary to melt it a second time to purify it. Then let it settle and cool slowly, so that the residues will have time either to settle to the bottom or come to the top. A little water at the bottom of each vessel will enable the residues to separate from the wax, which may be scraped perfectly clean when removed from the vessels.

Cappings, having but very little foreign matter in them, will melt more readily, of course, than old combs. They will also make nicer wax, sometimes almost white.

If you wish to have cakes of wax that do not crack after pouring into

moulds or vessels, do not pour the wax until it shows signs of congealing. When you pour hot wax in a vessel, it is very much expanded, and shrinks in cooling. That causes it to crack. But if it is poured when nearly cool, there is no shrinking, and the cake retains its shape.

Every particle of honey should be removed from the combs, by extracting, or by washing in warm water, before combs are rendered. This honey, diluted in water, will make excellent vinegar. Combs containing foulbrood should be burned. Combs from hives that have or have had foulbrood should be melted up before they are in any way exposed where bees can get at them. It is a misdemeanor to ship combs containing foulbrood, especially if they have honey in. Of course, they may be so packed as to remove all danger of contamination, but the parties to whom such combs are shipped should be well warned of their condition. Heating for a half hour to the boiling point will do away with all danger of reproduction of the bacilli of foulbrood, either kind. That is why comb foundation, which is made by heating beeswax several times over, has never carried disease, as was well proven by the tests made by N. E. France, of Wisconsin, some 20 years ago.

There are, of course, more extensive and quicker methods of rendering beeswax, but none will secure a better quality than the methods here mentioned.

As to whether it pays for the beekeeper to render his wax himself depends upon how much leisure he has and whether he can do the job right. Mr. Pellett says that he has always found it more profitable to send his old combs and cappings to the foundation factory, as they are able to get enough more wax out of them to pay for the work of rendering.

STARTING A BEGINNER RIGHT

By Dr. J. H. Merrill, State Apiarist of Kansas.

HOW many beekeepers have heard a remark similar to this: "We are very fond of honey at our house, and my wife and I have decided to buy a hive of bees so we can have honey the year round, and will you sell us one of your hives?" Furthermore, nine times out of ten, just to show you that he intends to be a real beekeeper, he will add, "What kind of flowers ought my wife to plant in her flower garden to feed the bees?" If the question were asked, "How should one start a beginner right?" and the above mentioned man is to be considered as a beginner, then the best way to start him right is to start him right at home. He should be given some facts and figures which would convince him that he could have honey all the year round at his house much cheaper and be more certain of his supply if he bought it of someone who made beekeeping a specialty rather than if he depended on his one colony of bees to harvest the year's supply of honey from his wife's flower garden. To the mind of the average city man who has rural yearnings, one cow, twelve hens, a backyard garden and a hive of bees represent perfect bliss.

The advice which is usually given to one about to begin in beekeeping is to start with one colony, study this carefully, and then expand in the business in proportion as his knowledge of beekeeping increases. This advice is good, and some of our best-known beekeepers started beekeeping with but one colony of bees. Dr. Miller made his beginning in this way and A. I. Root, who was then a jeweler, paid a man a dollar to capture his first swarm of bees for him. It would probably be safe to say that most of our successful beekeepers made their start with but one or two colonies of bees. However, in addition to the colony of bees which they owned, they had other qualifications to which their success must be ascribed. They had an interest in beekeeping, were enthusiastic and, moreover, had a natural aptitude for this form of business. They were not satisfied only with what they themselves observed, but they talked with other beekeepers, read everything they could secure on the subject of beekeeping, attended meetings of beekeepers, and never neglected an opportunity to increase their knowledge of their pet subject. These qualifications would have made them successful in any line of business which appealed to them sufficiently to call forth these characteristics. With some men it is beekeeping, with others banking, law, medicine or theology, and whichever one of these callings arouses a sufficient response in a man is the one in which he will make a success.

In starting a beginner right, it would be well if we could know just how he is going to respond to the appeal of beekeeping before giving him any help. We cannot know whether he is going to become an A. I. Root or a Dr. Miller, but we can, to a large extent, form a fairly good opinion as to how he will react to beekeeping. At a recent beekeepers' meeting I heard a prominent beekeeper make the remark that any man who keeps less than 25 colonies of bees ought to be convicted of a misdemeanor. After the meeting was over I asked him how he made his start, and he answered, "caught a swarm." The point he wished to convey was that if a person had 25 colonies of bees he would then have sufficient capital invested to compel him to give his bees proper attention. But even that argument does not necessarily hold, because some people have the spirit of martyrdom so thoroughly imbued in them that they would really gain more satisfaction in losing 25 colonies than one.

The actual number of colonies with which a beginner makes his start is not the thing of greatest importance, after all. It is the mental attitude behind the move which really counts. If the beekeeper is actually interested enough in the pursuit of beekeeping to secure books and magazines on the subject to be read and studied either before or during the period that he is getting actually acquainted with his bees, then, whether he has begun with one colony or twenty-five, the chances are all in favor of his making a success as a beekeeper.

I have a beekeeper friend who used to sell beekeeping supplies to the beekeepers in his neighborhood. He had one strict rule of procedure and that was that he would never sell supplies to anyone who did not possess at least one book on beekeeping. That may sound drastic and inconsiderate, but the general effect in that beekeeping community must have been a commendable one.

The beginner who will not take the trouble to provide himself with books about beekeeping, or subscribe to the periodicals devoted to this subject, is foredoomed to failure. All of the time and effort that a real beekeeper spends in trying to help such a lackadaisical beekeeper will really be time wasted. The beekeeper would be ahead of the game if he devoted this wasted time to caring for his own bees and then made the beginner an outright gift of honey. This would cement their friendship and eliminate one more nuisance from the beekeeping world.

The proper answer to the question as to how to start a beginner right would seem to be as follows: First, find out what sort of a person this beginner is, and then, if he seems in earnest, advise him what books to purchase, what periodical to subscribe to, how to secure his bees, and be ready at all times to help him with all the good advice you can possibly give. Every good beekeeper is a booster to the business, and the beginner who shows signs of becoming such a man should receive every possible encouragement. It is as true in beekeeping as it is in every other walk of life, that the man worth helping is the one who is willing to help himself.

ABOUT THE "LANGUAGE" OF BEES

By Prof. Dr. H. v. Buttel-Reepen, Oldenburg in Old.

There are many problems in bee-life, which hitherto have been explained one way or another. Dr. v. Frisch, Professor of Zoology, University of Rostock (Germany), has given in former works his statements about the sense of color and shape in bees as well as those about the sense of smell, and in a present "Research of Psychology" (Ueber die "Sprache" der Bienen—about the language of bees—published by Gustav Fischer,

Jena, 186 pages with 25 illustrations and partly colored plates), he tries to show by careful and ingenious experiments the way how bees come to an agreement with each other, how they "speak" with each other. His conclusion is, that the "language" of bees is—as far as can be ascertained up to now—only based on a very acute sense of touch and of smell, and that very likely a sense of hearing does not exist.

The astonishing results of the experiments of v. Frisch may be given by an example:

Early in the morning, a certain kind of plant opens its blossoms and is ready for fertilization. Suddenly a bee appears and finds the nectaries of the blossoms overflowing with nectar. She fills her honey-sack and impregnates her body at the same time with the odor of the flower. Having come home, she begins a peculiar kind of dance on the combs, which excites the comrades, that perceive this dancing in the darkness of the hive only by touch, and at the same time take notice of the smell of the flower which adheres to the body of the dancing fellow. The effect is that they rush out of the hive in all directions in search of this new distribution of nectar. All those which find the new source of living begin to dance, too, having come home again, and attract some more to go about examining the neighborhood. But as soon as the nectar in the blossoms gets scarce by the many visitors who, allured by the dancing found out the new supply, the returners do not dance any more, therefore no new invitation is given. By this wise instinct which only excites a dance, when plenty of food is discovered, an overcrowding of the yielding spot by the fielders is prevented.

It is therefore not a peculiar kind of humming which leads the comrades to the place where honey is to be found, but only the dancing as incitation and the smell of the nectar producing plant, which sticks to the body of the bees.

But if a plant without smell opens its blossoms, v. Frisch says that bees which detect honey-producing plants allure other bees by emitting a peculiar kind of scent. This statement was first made by F. W. Sladen. He noticed that on certain occasions, when bees gave a "joyful hum," they adopted a strange attitude. Each bee stood with the apex of the abdomen more or less elevated and she exposed a large portion of the membrane connecting the fifth and sixth segments of the dorsum, which normally lies hidden under the 5th segment. It struck him that this membrane might produce the scent he had noticed and that the scent might be employed as a means of allurement whenever the instinct of any worker prompted her to call her comrades. The very "humming" or fanning seemed to lend support to his theory, for he asked himself: Would not the disturbance of the air caused by the vibration of the wings distribute the scent far and wide? (Ent. Monthly Magazine, 1902).

I indicated this theory of Sladen as "very credible" in my book "Leben und Wesen der Bienen" (Life and Nature of Bees), in spite of not being able to confirm the existence of this peculiar scent, as apparently my nose was not fine enough to detect this smell. V. Frisch says that he noticed the scent, emitted by that gland, very distinctly, and he gives the statement that bees, as soon as they detect a new source of food, extend, or stretch forth, this gland and by fanning distribute the scent so that bees in the neighborhood are allured. In this way blossoms without odor, if they are only discovered by a few bees, very soon are known to many fielders.

When bees make out a new and rich yield of pollen they begin to dance as well on the combs, but this dance is of quite another kind. It is a wag(the tail-dance (Schwaenzeltanz), which each careful observer has already often seen without knowing that it was a sign of communication.

There are many other very interesting results and statements in the book of Prof. v. Frisch. It deserves high commendation, as it is one of the best scientific works about bees which ever appeared in Germany. It is written in such an intelligible and pleasant style and provided with such splendid illustrations that all beekeepers and friends of nature, who know German, will understand it perfectly.

LOCATING OUTYARDS

By J. E. Crane

WHERE best to locate an outyard is a question of a good deal of importance and not easy to answer. Of course, what we want is an abundance of honey-yielding flowers, as the most important condition with several other very desirable conditions to go with it. Sometimes we may find a place where there is an abundance of flowers, but the distance may be too great, or it is not easily reached by reason of steep grades or poor roads or entire lack of roads, or the morals of the community may be such as to render your yard unprofitable.

Again, it does not always follow that we get the most honey where or when flowers are most abundant. We used to think the flow of honey depended on weather conditions , and it does to a considerable extent, but we have learned with the years that the character of the soil has much to do with it. Clover will yield much more freely on clay or limestone soils than on light loam or gravelly soil. Again, buckwheat yields better on light or sandy soil than on clay. Living in a section largely clay, I have known but two years in which bees have given me any surplus from buckwheat in nearly sixty years.

We are highly favored in this country in having several honey-producing plants, as white and alsike clover, basswood, buckwheat, alfalfa, sweet clover, etc., besides many others of less value. Now to make an outyard profitable it is very desirable that at least two of these major producing plants should abound in any location selected for an outyard, then if one fails, the other may prevent a complete failure. If we can include white clover and basswood we may succeed very well, or if we have only white and alsike clover with buckwheat the location may prove very satisfactory. Again, we may have alsike and alfalfa, or alfalfa and sweet clover, or it may be we can get a good range of clover with an abundance of swamp nectar-yielding flowers. In some places in the east wild majoram or thyme have come in so abundantly they make, with clover, a good location for bees.

In addition to these major sources we may well include many other sources of nectar which, if not depended upon for surplus, are of exceeding value in building up a yard to its most productive capacity, such as maples, dandelion, fruit bloom and many others too numerous to mention.

While a good flow of nectar is very desirable in locating an outyard for bees, it is by no means the only thing to be looked after. Partial shade for your hives is very desirable, as an old orchard or the edge of a forest. I have sometimes set out trees of rapid growth for this purpose, or let small shrubs or trees grow up in the yard. Not only is the shade desirable, but it often keeps bees from drifting or partially hides one part of a yard from another which is often a help when working with them.

Other things being equal, it is better to locate in a moral, church-going community than where the Sabbath is desecrated and there is a low state of morals.

Both supers and hives are safer where children are brought up to respect the rights of their neighbors. I hardly need say that it is better, if possible, to locate where there are no bee diseases. To locate where brood diseases prevail would be likely to prove disastrous unless you are acquainted with these diseases and and know how to handle them, and even then it is not wise to locate near another commercial or extensive beekeeper. I have never known a person to do this and meet with much success, besides it is mean and selfish, and selfishness is at the bottom of a large share of our social troubles, and should be frowned upon by every right-thinking person.

Nor should a yard be started where it is likely to prove a nuisance or even an annoyance to others. The golden rule is as useful in locating an outyard of bees as in many other affairs.

One thing more, an outyard (and a home yard too) should be located in a sheltered place, well protected from

winds. This is a most important consideration. A few years ago I was asked to look over a yard of bees by a man who thought of buying them. It was well along in May. The yard was located on a little rise of land and where the wind had a full sweep from almost every point of the compass. There were, I should say, about 75 hives. I found, I think, one-third of them already dead. Of those that remained there was from a pint of bees up to two quarts to a hive, and not one first-class colony in the yard, and the yard almost useless so far as a crop of honey was concerned that year. Of what use is a plentiful flow of nectar if you have no bees to gather it? We have found the leeward side of a hill or the edge of a forest in a pasture a very good place.

Wishing to start a yard some years ago in a very windy section, we went to the edge of a pine forest and the young trees have grown up so our yard is entirely surrounded by evergreens, and while the wind has blown at times so hard as to tear the limbs from the taller trees, our yard has remained unharmed.

Now it is not possible, often, to get all these good qualities in our outyards, but we should try and combine as many as we can, even if we have to go some distance for them. The use of an automobile makes it practicable to run outyards ten, yes twenty or even fifty miles away. Automobiles have seemed to me, however, rather expensive. The trouble seems to me to be that most persons who drive them want to drive them about twice as fast as they will stand for and as a result they wear out quite too fast.

Vermont.

WILL THERE EVER BE A STANDARD AMERICAN HIVE?

By Kennith Hawkins.

SCARCELY a meeting of amateur beekeepers occurs but that a discussion arises as to what hive to adopt and what is the American standard hive. Unfortunately, most of the discussion to which I have so far ever listened, is based upon convenience of the manufacturer or assumption that equipment and not beekeeping methods would solve the beekeeper's problem and seldom the real question at issue—what is need according to the principles of bee behavior?

Let me sketch briefly American hive history. Real commercial honey production began in this country with the concurrent invention by Langstroth and Quinby, of the movable comb hive. Langstroth's idea prevailed and a hive smaller than the Quinby has become the principal hive used in this country, called the 10-frame Langstroth. Honey production for a decade or so afterward was a series of startling discoveries as to what could be done with bees by the use of the movable comb hive, and some remarkable yields of honey, for those days, followed.

Unfortunately there came what we are pleased to call the "comb-honey era," fostered in the white clover region of this country, where all the tendency in hive construction was toward a smaller brood chamber, to force the bees into the supers and prevent, by the small brood body and activity of the queen, the deposit of any honey in the brood chamber. I say unfortunately, not because I deprecate the production of section comb honey, but because hive tendencies of that time and the influence left on American beekeeping methods was lamentable. This led to the invention of the Heddon hive and a general adoption of the 8-frame Langstroth hive. Fortunately the Heddon hive is seldom seen now, and the 8-frame hive, for a time consistently abandoned, unfortunately now seems again on the ascendancy.

In those days honey producers began to complain that their territory was failing and that honey production was no longer paying in their locality. There was no one at that time with an understanding of bee behavior to point out to them that it was methods of honey production and not "locality" that failed, as the same localities are now considered some of the best in this country.

With the ascendancy of influence by the U. S. Bee Culture Laboratory on American beekeeping practice, there began a consistent movement to bring about the adoption of the 10-frame Langstroth hive. Not because this favored any manufacturer, but in the belief that this hive, in the hands of the average operator, would give better results. The adoption of the 10-frame hive and abandonment of smaller hives was given a much greater urge in war time honey production, which of necessity favored extracted honey because of the necessity for volume and ease of shipment. So, for the ten years ending in 1918, most beekeepers discussing equipment gave more serious consideration to the 10-frame Langstroth hive than any other.

Fostered by the study of bee behavior, beekeepers soon found that forcing the bees into the supers because of inadequate room in the brood chamber also forced them into other less desirable directions, as excess swarming, smaller honey crops, poorer wintering, and no real economy. Bee behavior also taught them that the real means to big honey crops, easier swarm control and better wintering was a brood chamber large enough to accommodate virile queens in the height of brood rearing. This gave the force of bees to go into the supers without forcing, and adequate room for sufficient winter stores and spring stores without wasteful feeding operations in spring and fall. With this gain in information and experience came the general adoption of 2 10-frame Langstroth bodies as the standard cubic space necessary for an all-season brood chamber.

England has just adopted, by acclamation, the 10-frame Langstroth hive as their standard. The United States does not seem much closer to such an adoption than at times in the past. The manufacturer should not be allowed to choose such a hive, as he would give greater stress on manufacturing convenience. Perhaps the beekeeper alone should not be allowed to choose, as he would perhaps not give manufacturing problems sufficient consideration. The beekeeper needs the service of the manufacturer, and certainly the manufacturer needs the beekeeper.

The Dadants have been working out their problems and have evolved the Modified Dadant hive, an 11-frame hive, Quinby depth, with frames spaced 1½ inches from center to center. The "Quinby" or "Jumbo" hive of 10-frames, Quinby depth, has been on the market for many years, carried by the apparent movement toward a "large" hive with one brood-chamber, but has played no important part in fulfilling such a demand. The Modified Dadant hive has not yet filled this demand, if it ever will, for it has only been on the market four seasons available to American beekeepers, and has yet to prove to the satisfaction of widely scattered individuals that it is the "large" hive they desire. There is, however, little question of its success in the hands of the Dadants and those whose honey flows and seasonal temperatures are similar to those at Hamilton, Illinois.

The greatest drawback to the 10-frame Langstroth hive as a "standard" is that the two bodies necessary for a brood chamber require more manipulation than might some large hive with only one brood chamber. In some southern localities it is not expedient to winter bees in two brood chambers, because of out-of-honey-flow season brood rearing, with too much honey on the hive. In Texas many use the hive with frames shallower than Langstroth, particularly in the production of their bulk comb honey. In southeastern states many favor the 8-frame hive, both for the production of comb or extracted honey.

Again, then, I ask the question: Will there ever be a standard American hive? I do not think so. Because of the size of our country with its great variety of seasonal temperatures, sources of honey, light and heavy honey flows, hundreds of colonies still kept in box hives, and with no concerted effort toward standardization among beekeepers or manufacturers, the question is too broad to settle off-hand. It is lamentable that the only effort so far made looking toward elimination of some useless beekeeping equipment and a consideration of standardization of some items has been blocked by the refusal

of one manufacturer supplies in this country to even participate.

I venture the opinion that most of those who are working for a "standard" hive, with few exceptions, are working toward some sort of equipment and not its adoption with a view to serving bee behavior. I venture further, the opinion that more honey is lost in this country today from inadequate super equipment than any other one cause. I believe any hive which becomes "standard" for any majority of our territory, will become so by popular acclaim voiced through purchases rather than through adoption at any meeting which might be called.

After visiting hundreds of beekeepers, traveling in 38 states and holding and attending several thousand meetings, I truly think the greatest lack in American beekeeping practice today, which could easily be remedied, is that too few beekeepers carry an adequate stock of supers to handle a maximum flow in their locality and that we look too much for a "Holy Grail" hive instead of better beekeeping.

Wisconsin.

WATER STORED BY BEES

By Wallace Park, Iowa Experiment Station.

THE timely editorial, page 119 of the March issue, emphasized the fact that **different conditions cause different results.** I will quote the editor's first remark : "The statements regarding water uses and storage, in the hive, which disagree completely with the recorded information of the past, may be due to different conditions." And the editor is just right.

The fact that the earlier observers failed to discover water deposited in combs, does not prove that it did not occur, but is a good indication that such occurrence was rare under the atmospheric conditions of humidity and temperature in which they lived and made their observations.

That bees deposit water in cells has been reported recently in the American Bee Journal by Chadwick (1922, p. 158), Small (1922, p. 272), and Rayment (1923, p. 135). It is to be noted that all three of these observers live in hot, dry climates and, according to the statement of each, water was observed in the hive only during hot, droughty weather.

Chadwick advances the very plausible theory that this water is employed for the cooling effect derived from its evaporation. Small supports this theory and adds the opinion that a certain degree of humidity is necessary to keep the larvæ from drying up. Rayment makes no comment upon the use made by the bees of water so deposited, but takes no exception to the explanations already given. It is to be assumed that the bees use some small part of this water in preparation of pap for the brood, but according to Chadwick, "The quantity of water used by a colony of bees for the purpose of ventilation exceeds that used for all other purposes, many times."

It is to be noted, however, that even in such cases as mentioned by Chadwick, Small and Rayment, there is no storage of water in the same sense that honey and pollen are stored, i. e., as a carry-over for a period during which additional supplies cannot be obtained. On the other hand, water so deposited apparently is intended only for immediate use in the regulation of temperature and perhaps humidity in the hive.

In most localities, however, there appears to be an actual need for some means whereby the bees can store a supply of water sufficient to last the colony from one flight day to the next during the early spring brood-rearing period. Observations and experiments to determine how the bees meet this need have been in progress during the past four years at the Iowa Experiment Station.

During early spring in this locality, bees are able to obtain water for brood-rearing only on occasional warm days. The evidence which shows that at such times bees bring in more water than is required for one day follows:

On the first flight day following a period of confinement, bees carry water feverishly; but carry little or none the next day, even though the day be pleasanter and water readily accessible.

Records of numerous instances in which this has been observed, appear among my notes from which the following are selected as typical:

"April 28, 1920, 8 a. m.—Temperature 42 deg. F. Chilly northwest wind. Sun bright. (Last previous flight day was April 22).

"There was a light frost last night and now the bees are gathering water from the grass blades. The water carriers are so thick on the grass that their hum is almost as noticeable as when bees work heavily on clover blossoms. "

"April 29, 1920, 8 a. m.—Temperature 50 deg. F. Light breeze from southeast. Sun hazy.

"Although the temperature is 9 degrees higher than at this time yesterday and there is much less wind, very few bees are flying. The dew is not so plentiful as yesterday, but there is some and the regular watering place is available, but the bees show no interest in either."

"May 13, 1920, 9:30 a. m.—Temperature 48 deg. F. Chilly east wind. Sun hazy. (Last previous flight day was May 10). The air is full of bees busily engaged in carrying water from the grass, from puddles, from the garden soil and from the regular watering place. Scarcely a bee can be found on dandelions or fruit bloom although there is no lack of bloom on both. 11:00 a. m.—The bees have quit gathering water and few are leaving the hives."

"May 14, 1920, 9 a. m.—Temperature 53 deg. F. Calm. Sun bright. Only a few bees are carrying water this morning, although the frost has left the grass wet and the weather is much pleasanter in every way than it was yesterday when the bees were carrying water so frantically."

Some notion in regard to the amount of water brought in at such a time may be gained from the following: Data secured on May 17, 1920. following a one-day period of confinement show that between 6:30 and 11:15 a. m., 3 colonies on scales carried in water to the extent of 3, 4 and 8 ounces, respectively. The amount of water carried was in proportion to the amount of brood and bees in the colonies under test.

Since careful examination of the combs failed to reveal water deposited in them at such times, the natural conclusion was that the water must have been retained in the bodies of the bees. This conclusion was supported by the following line of evidence:

It was observed that water carriers did not deposit their loads in the comb, but transferred them to other bees, which served as "reservoirs" for the colony.

By using a one-frame observation hive, it was not difficult to follow individual water carriers from the time they entered until they left the hive. It was found that the "reservoirs," in which water was stored on these occasions, were the **honey sacs** of numerous bees of the colony. It could be seen that, as the water was transferred, the abdomen of the water carrier decreased in size while that of the "reservoir" bee distended. As more and more water was brought into the hive, an ever-increasing number of these "reservoirs" were distinguishable by their distended abdomens.

It seems strange that this method of storing water should have escaped the notice of other observers, but I know of no reference to it in bee literature.

A somewhat similar phenomenon, however, is known in the case of another hymenopterous insect, the **Honey-ant.** In this species, certain workers having enlarged abdomens serve as storage vats for a sort of honey which the other workers collect from oak galls. And, according to Comstock's Manual, "When the season for obtaining this food is past, these living cells disgorge their supply through their mouths for the use of their hungry fellows."

The "reservoir" bees were quite inactive and occupied places surrounding the brood area rather than within it. It was observed also that when a good flight day was followed by a period of several days or a week without access to more water, the abdomens of these "reservoir" bees became greatly reduced in size; but on the first subsequent flight day it became evident that the "reservoirs" were being refilled.

Experimental evidence

In an experiment which was repeated several times, an observation colony was fed water that had been colored with a harmless and tasteless dye. The feeder was so placed that it was possible to mark every bee that took a load of water. In a short time it was found that rarely did an unmarked bee appear at the water pan but that those already marked made repeated trips for more water. The colored water was easily distinguished through the semi-transparent abdomen of any bee that contained it, and by evening several hundred **unmarked** bees showed the presence of large loads of colored water.

The last time this experiment was performed a test was made to determine whether these "reservoirs" were filled with water alone, or a mixture of water and honey. The following results were found: Of nine bees tested, three had water only, three others had water containing just a trace of honey, while the loads of the other three bees varied from slightly more than a trace of honey up to a very appreciable amount of honey, probably about one part of honey to four parts of water.

The following morning it was found that about 1300 bees or 50 per cent of the colony were acting as "reservoirs" as indicated by the color and distention of their abdomens. This apparently was a considerable increase over the number observed the previous evening, in spite of the fact that they had received no more water. It was noticed at this time that traces of the color were present in practically all of the "reservoirs," but that very few of them contained the colored water in an undiluted form

The increase in the number of "reservoirs" which mysteriously appeared over night was readily explained, however, when a test was made on such individuals. Of 31 bees tested, 1 carried water only; 1 had water with a trace of honey; 3 showed mostly water with some honey, and 26 contained honey somewhat diluted . It should be stated that the number of bees taking honey from the cells was observed to increase greatly soon after the water was given. Thus it was found that within 24 hours, the colored water had been widely distributed among the bees so that each one of approximately 1300 bees had received a small portion, which she had combined with thick honey from the comb.

Other Observations

On several occasions, when the bees were carrying water from the feeder and were not leaving the hive at all, fresh deposits of some clear liquid were observed in a limited number of cells in or near the brood area. Individual bees were watched as they entered the cells, backs downward, and deposited the content of their honey sacs in cells that were empty when the bees entered them. Tests showed that the liquid deposited was not water alone, but water to which honey had been added. But such deposits were negligible so far as the amount stored was concerned, and usually disappeared in a day or two.

Thus it was found that in storing water to last from one flight day to another in spring, the bees did not keep the water by itself longer than a few hours, but combined it with honey. A small amount of this diluted honey was sometimes deposited in or near the brood area, but most of it was retained in the honey sacs of numerous "reservoir" bees. The amount of water that can be stored in this manner is quite limited, especially in a small colony. But during the early part of the brood-rearing period, the quantity of water required is not large, and as brood-rearing increases, flight days come more frequently. It has often been noticed that brood-rearing tends to slacken during protracted spells of cool weather in spring. It is my opinion that the inability of bees to store a sufficient water supply often is one of the important causes of such a decline of brood-rearing.

So we must conclude that, under one set of conditions, bees deposit water in the hive to regulate temperature and perhaps humidity. Under another set of conditions (the more common of the two in temperate climates), they store water by combining it with honey in the honey sacs of numerous "reservoir" bees where the mixture is retained until used.

PUTTING THOUGHTS OF HONEY IN THE BACKS OF THEIR MINDS

By Robert S. Merrill.

A GOOD idea for increasing the sales of honey in a community was given me the other day by a friend.

This man is the service director of of a large press clipping bureau where fifty girls are constantly reading newspapers and cutting information from them. Now you may have the idea that such a concern is for those who want to find out how often their name appears in print.

Not so, the biggest part of it is taking "chances to sell."

"How could a beekeeper use such a service to increase his sales of honey?" I asked him, after he had explained something of the work.

"Well, newspaper items probably could be used for such a business with profit," he replied. "But the best way would be for the beeman to read his own paper for tips. He could do it better because he would have only that one thing on his mind, where readers in a clipping bureau have hundreds. Besides, we would have to cover a big territory to make it pay us."

I wanted to know just how he would go about it if he had honey to sell and were located in or near a city of 5,000 or less.

"The first thing I would do," he replied, "would be to get some booklets or folders advertising my business. If it were possible I would include in this booklet some uses of honey—recipes that would appeal to women, and some ways of making candy with honey, in order to get the thought of the children in it. And of course there ought to be something about the healthfulness of honey. I know we see paragraphs in our papers every once in a while along that line.

"One big point is that the booklet ought to be given to a good printer, for it is necessary that it be attractive in order to secure attention. It really ought to be illustrated and have some colors in it, but I suppose the cost of such a printing job would be too high for the average beekeeper." (He did not know that folders and leaflets in colors could be secured at a reasonable rate from publishers of beekeeping litrature).

"Now what would we do with this after we got it?" He went over and selected a paper from a big stack. "Here's a paper from a county seat of about 4,000 population. Let's see what we find in its local news columns.

"What about this? 'Mrs. James Smith entertained the members of the Eastern Star at an informal luncheon at her home Tuesday.' Suppose we send her a booklet. She may entertain again some time and perhaps she will think of using honey some way. Especially if the booklet comes to her while her mind is still filled with the problem of good things to eat. At any rate, she has a home and we may get her interested in honey for the home. And if she likes it isn't she likely to tell her women friends in the lodge?"

"That suggests that the honey man might do well to mail one of his booklets to officers in the various lodges, getting the names when the paper prints news of the elections.

"No letter is necssary with a booklet mailed at the right time, unless the honey man wants to enclose one quoting prices. But I would use a 2-cent stamp. A green stamp makes it look like a cheap circular.

"Here's another item: 'The school board met Monday and elected the teachers for the coming term,' Nothing in that for us is there? Wait a minute 'Domestic science teacher, Miss Helen Loomis, of Mercerville.' Let's mail her a booklet at her home in Mercerville. It doesn't need a street address, a county seat 50 miles away. But why send her one? She is going to teach foods and cooking to the girls from a number of homes here in town. They talk about their lessons to their mothers, and these mothers do the buying. Suppose you got the teacher interested and after she came to town bought a sample jar of your honey to

make candy — they do make candies, at times, in schools. The girls see your label. Se how a circle of advertising has begun? And as these girls are not going to wait a long time after graduating before marrying and having homes of their own, I'd watch for later papers that might give me a list of the pupils who are taking domestic science.

"Look at this: 'The many friends of Mrs. Charles Markley, who has been seriously ill at her home will be pleased to learn that she is now on the road to recovery." Isn't honey supposed to be tempting to invalids and to convalescents? Wouldn't a booklet reach her at a time when she had plenty of leisure to read it thoroughly? And suppose she did buy a jar. Isn't it likely she would mention it to many of her friends who came to call upon her? Or your booklet be left lying on the table where it would attract their attention?

"Here is a different angle: 'Miss Marian Spink entertained a number of her little friends Tuesday afternoon, in celebration of her fourth birthday.' Now, it isn't likely that Marian gets so much mail that a letter or envelope addressed to her would fail to attract attention in the family, is it? Send her a booklet and the family, wondering what it is, gets interested in honey, its healthfulness —and let them read out something about candy and little Marian is not likely to forget it. Will little Marian let them throw away the booklet for some time? Her mail! I should say not.'

But there was something I wanted to know. So I asked my friend if he thought that mailing booklets to these people would bring orders back in many cases.

"They might," he replied. "But what if they don't every one bring a direct return? What I would be after, if I were selling honey, would be to get people to thinking more about honey and more particularly about my honey. You can't tell when they are going to talk about honey or be reminded of it—but when they do recall honey I would want them to remember me.

"You have dropped a pebble in the water and heard the splash, but did you notice how far the ripples spread? It's the same way about mailing out booklets—you can't tell how far the ripples are going to spread.

"My idea in getting ideas for mailing booklets from the local papers would be to **pick the times when people were more interested than usual in foods.** Isn't the suggestion of your honey more likely to stick in the back of their minds if they get the booklets at the time they have been thinking foods, than if they got advertisements in the regular course of the mails?

This thing of getting prospective honey buyers from the papers is not difficult. But it does require some patience. A man would have to sit down with the pages of the local weekly before him and weigh every item he read, except that 'Mrs. Lee Blakely spent several days this week with her mother at Petersburg,' checking every paragraph against the question 'When could they use honey?' "

And then he added: "Yes, and I could use those ordinary items about women visiting their mothers or anybody else out of town, if I wanted to get a little form letter printed, something along the line of: 'The next time you visit relatives out of town take along a jar of our honey, etc."

I admitted that it did look like the local paper might be alive with opportunities.

"Bear in mind," he added, "that if the honey man read the paper regularly his mind would become trained to seeing beyond the bare news item and perceiving a time when honey might be used. If he were a good personal salesman he could follow up many of the hunches he secured.

"For instance, take this item about the Chamber of Commerce going to give its annual banquet. In a town of 4,000 I would want my honey to be served on the banquet tables as an example of one of the town's products. It ought not to be hard to arrange. And in many cases little angles like that get included in the local paper's write-up of the banquet.

Other chances for personal follow-up would undoubtedly suggest themselves, but in case a man is too busy, there are countless opportunities for mailing out the booklets to advantage."

Then he began to sketch hurriedly, as his eyes ran down the columns, some things that might tend to business.

" 'Entertained at a breakfast,'—honey is a breakfast proposition.

" 'Her young friends at a taffy pull'—get them interested in candy from honey.

" 'Elected the following on the refreshment committee of the Woman's Club.'—women interested in foods.

" 'Hostess to her fellow clerks at the Peerless Department Store.' They all eat, they'll marry and they **can** BOOST."

"Weddings? Why not send one to every bride?"

He looked up and added: "Surely a beekeeper can find business-building tips in the local papers. We dig them out for all kinds of businesses." He turned to a girl waiting for him:

"What is it, Miss Dow?"

"Why, I have only one copy of this paper and the items will clip into each other. Which is the most important—a chance to sell a lungmotor to a bathing beach, or a chance to sell a wooden leg?"

Yes, the beekeeper might use items from the papers with profit.

A SUGGESTIVE SIGN

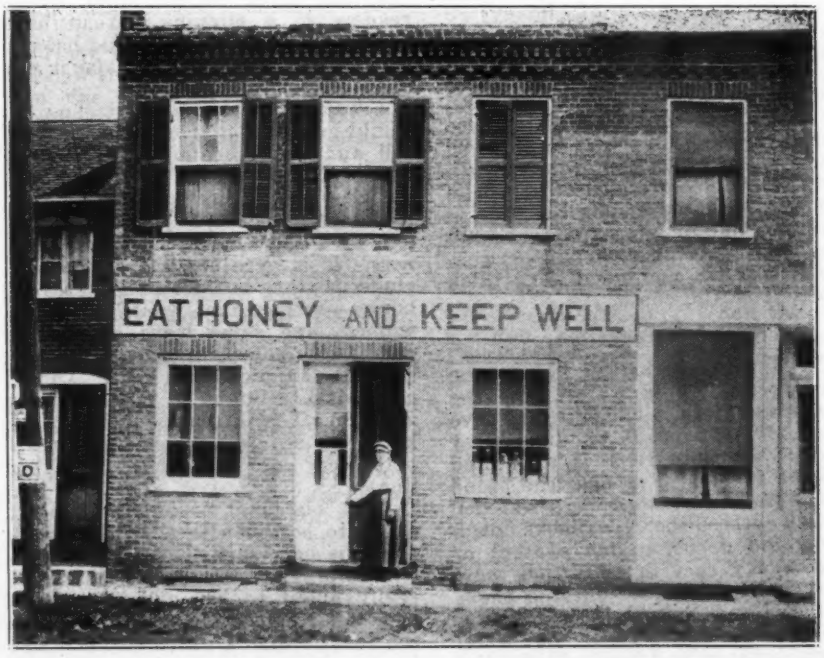
The photo shown herewith shows the sign over the door at the home of Miss Mathilda Chandler, of Wisconsin. Miss Chandler is an extensive honey producer, operating several yards. The selling of the crop at a good price is as important as the production of a big yield. Miss Chandler has established a local trade for a liberal portion of her output.

SELLING HONEY DIRECT TO THE CONSUMER

By Melinda Field.

Those who have produced and sold honey for any length of time realize that with the present-day competition it is somewhat of a task to dispose of all that is produced. Retailers purchase is based upon the amount of sales and frequently he does not order again until entirely out. With this thought in view I began to study out a plan of disposing of my product direct to the consumer.

I had been conducting a refreshment stand on the lawn of our prop-



Home and honey salesroom of Mathilda Chandler, at Cassville, Wisconsin.

erty, adjoining the state highway. The building was 8x10 feet and painted white, making it look very attractive. I sold ice cream, soft drinks, candy, cigars, etc., and encouraged families to hold their picnics on the lawn. Business was good, so I conceived the idea that this would be an excellent place to dispose of the honey.

Happening to have a quantity of 6-inch matched boards on hand, I had them put into a nice pergola stand facing the highway. This was painted attractively, also. I provided for a table in the center with shelves around the sides. This was made as fine a place for displaying the honey as we could wish for. Cans of honey varying in size from 30 oz. to 10 lbs., were nicely arranged on the table and shelves. A large sign 4x4 feet in size was placed on the upper part of the building in a conspicuous place: "PURE HONEY FOR SALE HERE." As they could see the sign readily, as well as the fine display of cans, which were attractively labeled, they were convinced that we did have honey for sale.

In order to positively convince the people that they were getting as pure and fine honey as could be purchased, I began serving small hot baking powder biscuits on a dainty plate with a good portion of honey. Not one person, after tasting the honey and biscuits, ever left the stand without purchasing at least one can of some size. In addition to the biscuits, I gave the customers recipes for making cookies, cakes, etc., by using honey and less sugar. My reputation for good honey was soon established. Many tourists who had sampled the honey and who knew that they would not likely come this way again, ordered a larger amount and made plans for having some shipped them at a later date.

My trade did not seem to interfere with the retailers in any way, in fact I believe that the majority of customers I procured were people who had not had an opportunity to give honey a thorough trial.

My business that year grew by leaps and bounds, and now I am convinced that honey can be sold direct to the consumer without any great effort.

New York.

SELLING DIRECT TO THE CONSUMER

An Example of Successful Roadside Marketing of the Honey Crop

By Edna M. Trochler

Our apiary consists of about 250 colonies and we are on a much traveled automobile road, 40 miles east of Chicago and about four miles east of Gary, Ind.

My brother used to dispose of his honey by selling to the local stores at Hobart. As the apiary grew, we began delivering to stores in neighboring cities. This method disposed of the honey, but took much time and patience.

Our next scheme was to advertise. A board two feet long was painted white and the word "Honey" was painted in large black letters upon it. This sign was tacked up on a post in front of the house. Autos going by would see the sign and stop to buy honey. Every satisfied customer meant more customers. Our business grew with leaps and bounds, until at last we had no need to spend time delivering to city stores. No agents were longer needed to peddle honey for us, going from house to house taking orders.

At present Mr. Mundell has an enclosed stand, built alongside the road. He has a cinder driveway fixed for autos, so they can drive right up to the stand, and they don't have to stop on the main road. He has a man hired to sit there all day long and sell honey during the summer months. They sell comb honey in single sections done up in pasteboard cartons. Larger quantities are put up in 12 or 24 section wooden cases. Extracted honey is put up in packages ranging in size from the small glass to the 60-pound can, graded as white, amber or dark.

He receives many orders by mail from old customers. He ships these by parcel post or express.

Sometimes the white honey sells out and he is forced to go to other men for a new supply, in order to hold his trade. .

In summer often as high as seven or eight autos stop at one time, on Sundays, or on holidays, Labor Day being the best of all. The sales in one day often run up to $80, or occasionally over $100. The regular daily sales on week days, however, are around $15 or $20.

Mr. Mundell sells only pure honey, and this, I believe, is his best advertisement.

New customers are often attracted by either of two mammoth signs, only recently erected alongside the road. One reads: "Eat Mundell's Honey, Made by the Bees." The other sign is opposite the sales stand and is triangular, so it can be read by autoists going east or west. It is really two signboards, set together. The signs read as follows: "I Am the Honey Man. Come Hear the Bees Hum. Joseph Mundell."

A straw skep is painted on the sign. City people notice that bees are busily flying in and out of these tiny holes, the supposed entrances of these sham painted hives, and wonder how it happens. It furnishes much curiosity, much fun and advertisement. The secret is that 4 strong hives of bees are fixed on a platform behind these sign boards, a real hive sitting behind each imitation hive. They are unseen from the road. Many people, out of curiosity, stop and buy who otherwise would not bother.

Does it pay to advertise? I say it does.

Indiana.

THE HUBER LETTERS

Necessity of Sheltering the Hives From the Sun—How the Author Came to the Conclusion that Pollen is not the Element Producing Wax.

(Continued from June)

Lausanne, Aug. 26, 1829.

Judging by reasons which appeared very good to me, I had long believed, as Reaumur did, that wax was produced from the fecundating dust of flowers or pollen, which I designated under the name of crude wax, in my first edition. I might have changed this designation in my second edition, but I did not wish to do so; you will forgive me for this; you will see in it my respect towards my dear and venerated master. I refer Elisa to the beautiful memoirs of Reaumur, whenever she wishes to know how much we are indebted to this excellent naturalist and whether I was wrong in believing in his views; in order to justify myself I need only to narrate to her what happened to me and what led me to discover a fact which I did not suspect in the least and which I accepted only after mature examination.

One day I was examining the bees of a great apiary which did not belong to me, and which the tenant of the country place in which I lived had left exposed, as usual, to the noon sunshine. The actions of those bees, their extraordinary humming attracted our attention; we noticed that they did not fly far away from their hives, that the number of those who did so and came back loaded, with pollen and perhaps with honey, was very limited as compared to that of the bees who brought in nothing and who appeared to be only trying to take exercise or to escape the too great heat of the interior of the hive. Repeating this observation with my own bees, I saw that my conjecture was right, those which were exposed to the sun showed no increase in weight, while those which were in the shade had increased by several ounces in the same lapse of time.

Those observations, repeated sufficiently, convinced me that it was not advisable to keep the hives in espalier shape, but that, on the contrary, they should be preserved from the direct influence of the sun's rays; this was already believed in the time of Virgil. He advises, in his Georgics, to **shade them under a palm tree or under some great olive tree:**

"Palma que vestibulum aut ingens oleaster adumbret."

The weather was cloudy on the following day, the sun did not shine, but the mildness of the air still permitted the bees to go to the fields and to seek their usual harvest upon the flowers of our meadows; it was much greater than on the previous day; all that flew away came back with the fruits of their labor, without having lost time in flying about their home.

We were in the season of swarm-

ing, at least one-third of the colonies had already swarmed; the new colonies appeared much more active than the old ones, the bees that lived in the latter brought back a great deal of pollen, those of the new swarms came home with their pollen baskets absolutely empty and carried only the pollen which had been gathered by the hairs with which their body was covered, without any design of their own.

Being somewhat astonished to see the behavior of the bees in this occasion, who brought so much pollen in the old colonies and almost none in the new, we began to doubt the use of pollen in wax making, for in empty hives wax is of absolute necessity; they need it to receive the eggs of the queen. The delicate texture of the eggs is such that the least touch destroys them, even by the workers. They can bear so little pressure that, to fasten them in the bottom of the cells, the queen appears to depend entirely upon the gluten with which they are surrounded as they pass through her ovaries. Whenever you wish to transfer an egg from one cell into another, beware of taking it with pincers of any kind; in spite of your dexterity you would surely break it. To transfer it safely it is sufficient to only touch it on its side with the pincers; it fastens to the metal as to a magnet and sticks to it through the gluten which I mentioned.

It is, therefore, absolutely necessary that these eggs be at once deposited in the cells, so as to prevent accidents. The shape of the cells and their material procure to those little beings everything that the best managed motherhood could desire.

The first duty of bees, at their arrival in their new home, is doubtless to prepare cradles for the young, which their queen, in a hurry to lay, must deposit in them, and it is of wax that they are made. An instant of observation, or rather of consideration, had just taught me that I had been mistaken, as were all my predecessors, in believing that bees found the elements of their wax in the stamen's dust. Our guide, Reaumur, had noticed that bees, confined to the hive by bad weather and unable to secure pollen, nevertheless constructed beautiful combs of wax. I had seen this many times in similar circumstances, but I had not stepped farther than my master, perhaps I had not dared to do so.

When you read this, you will have seen many bees swarm. The trouble and confusion which prevail in the hives at the time preceding the exit of the bees, the astonishing hurry with which the bees leave a home which appeared so dear to them, will have caused you to think, as it did me, that the bees then think of nothing but leaving and do not worry about any other cares. But it is otherwise and the bees themselves gave me the proof of it.

When I recognized the uselessness of pollen as original material in the production of wax, I sought for it in the honey, the only substance which (with the exception of pollen) belonged in the bees' household. The first idea that would come to you would be to put this to a decisive test, by enclosing the bees within hives where they would find only honey enough for their consumption and see what would follow.

If, after a few days of confinement, you should find beautiful combs of wax in all your hives, would you not conclude that your bees had built this out of honey? You would then have thought of reversing the test, that is, to substitute pollen for honey, and see what the bees would do with it in their prison, giving them a few sweet fruits and a little water so that they would not suffer from hunger or thirst. I can predict to you that you would never have found an atom of wax in the hives in which they were confined.

Suspecting that it was the sweet or sugared part of honey which has this astonishing property, you would wish to know what would happen if you gave your bees nothing but sugar dissolved in water and you would consider this suspicion as proven when you found your bees changing the sugar into wax, as if it were honey.

Seeing that honey, or its sweet part, was the primary substance for wax and that pollen did not contribute to it in any way, you would wish to know of what use this pollen might be to the bees, since its harvest seemed so important to them. It is the workers who care for the young; their duty is to feed them. I would expect you to make sure of this matter by a few direct tests; you would remove all the combs of honey from the hives, leaving only those that contained pollen and in which young bees have been hatched. Complete success would be the result. With the help of a magnifying glass you would see: 1st, the eggs enlarging in the bottom of the cells; 2nd, the young larvæ also growing, requiring more room in the cells than they did the previous day; 3rd, a few of those larvæ would already be changing to the nymph state, life everywhere. Then the pollen has proven to be the milk from which they were fed, and we need seek no farther the great importance of this crop.

(To be continued).

THE HONEYBEE IN CALIFORNIA

By W. H. Lewis.

Referring to your editorial item in the American Bee Journal, you ask, "Was there an American honeybee originally?" Further, "Why did it not exist in the best honey regions of America, California?" And then you say, "It is within modern man's memory that they were brought there."

California bee history and whether there was a native race of bees always gives me a jolt every time I read any of it, for I fear that "history" does not always state all the facts, and before it can be accepted as final I wish to make a few observations, for I will whisper to you that I am some pioneer of the Coast, having come to California with my parents in 1856, at which time I was old enough to ride a mule across the Isthmus, and well remember the incidents of that which, at that time was a perilous trip.

I do not wish to say anything that will detract from the reputation of the late Mr. Harbison, who is credited with bringing the first bees across the isthmus, for he surely had a grit to make the venture at that time. Neither do I wish to deny that there were no bees in the San Diego district at that time, but that there were no bees in the central or northern part of the state or in the Rocky Mountains I am not so sure.

Any person who knows the physical characteristics of the district immediately surrounding San Diego district will do ibt if it was ever possible for bees to be there in a wild state. Surrounded as the district is on every side except the sea by many, many miles of desert, mountains and plains, with hardly a living plant except a few cacti and waterless, it was hardly possible for bees to cross, for bees in a wild state will not and cannot expand beyond the limits of pasturage.

In the spring of '63 our family moved from near the coast at San Francisco to the Mariposa Valley, going by "prairie schooner" and horseback. When on the evening of the third day we stopped with a settler who had 15 or 20 box hives of bees, painted white and in a row, and they were very noticeable on the prairie, which at that time was almost a wilderness, with settlers few and far between. My brother knows of this as well as I do and ridicules the claim that the first bees were only brought to California the same year or the year before. These bees were fully 400 miles north of San Diego district, and there was no means of communication between the two districts except a very poor road over an almost endless wilderness of sunbaked prairie. Admitting that Mr. Harbison brought his bees to San Diego in '62, where did the bees I mention come from in '63?

Our family returned to near San Francisco the next season, '64, and in '66 I saw a settler with 6 or 7 box hives of bees, was present at the first and only time I ever saw bees brimstoned or "taken up," and tasted my first honey direct from the hive. I was bee hunting in the woods with this settler's son the same year, and there was apparently an abundance of them, and this was about 500 miles north of San Diego, and hardly possible that any bees from the south could have spread and become well established in the northern part of the state in so short a time. But if these bees were not native, where did they come from?

I went to British Columbia in '72, the first bees were reported to have been imported in '70, by the Moody family, which I knew well, but it is my impression that there were wild bees in the favorable districts of B. C. long before the Moody family or I was born, for the first bees in the woods were invariably grey-banded. I bought my first bees, which came from the woods in '86 or '87, and

they were grey-banded. I noted this fact many times in my early days. It was also noticed by Mr. Dundas Todd when he later arrived in the province. This was before any of the grey-banded races of bees had been imported from Europe, and if they were not native, where did they come from? In the last ten years this grey-banded race has disappeared, giving way to crosses of Italian stock.

And further, in an old book in my possession, entitled "Diary of an Englishman Crossing the Plains in 1849," which is well written and shows the writer to be a man of education and observation, the statement is made that after the grind and toil of crossing the plains these pioneers stopped in the Rockies for a week's rest and spent their spare time in hunting bee trees, of which there were a great number, and a good supply of honey was taken. This at a time when St. Louis was a struggling village and last outfitting point on the edge of civilization. Is it possible that bees should have crossed the wind-swept plains and established themselves in the Rocky Mountains a great many years prior to '49, even before the white man saw the Mississippi River, away in advance of civilization, or were they a native bee? And if they were in the Rocky Mountains at that date, well established, they would surely have spread to the Pacific long before the white settler arrived. These observations of mine lead me to believe that bee "history," as far as the Pacific Coast is concerned, is not accurate, and before it can be accepted you will have to show me, "I'm from Missouri."

All this will remind you that now I am getting to be a pretty old man, but I'm still in the bee game with the vim of the young bloods.

Edmonds, B. C.

FIRST BEES IN CALIFORNIA

The Rural Press for November 2, 1889, states that the original importer of bees to California was W. B. Hayford, of Colfax, and that he first brought bees to that place in 1856. This was ten years prior to the time when Mr. Lewis states that he saw the settlers' bees brimstoned. In 1859, according to the same authority, a Mr. Zumwalt brought 50 colonies and sold them in Yolo County at $100 per colony.

Mr. J. S. Harbison was among the pioneer beekeepers on the Pacific Coast, and was undoubtedly familiar with the history of the early importations. He did not claim to have been the first to introduce bees into California, but in his book which was published at San Francisco in 1861 he states that the first bees reached California in March, 1853, and that a Mr. Shelton brought them to San Jose, where several swarms issued the first season, two of which were sold at $105 and $110, respectively. A William Buck also brought out a shipment of 18 colonies, alive, which reached the state in November, 1855.

Harbison did not take his first bees to San Diego, as stated, but to Sacramento, arriving there on February 1, 1856. His second and larger shipment, consisting of 67 colonies, reached Sacramento on December 2, 1857.

Several more large shipments reached California before 1860. From Harbison's account it will be seen that bees were very generally distributed in the region mentioned by our correspondent from five to ten years before the time he mentions. Had the honeybee been native to California, Harbison would undoubtedly have mentioned the fact, as he was on the ground soon after the arrival of the first bees, having himself reached San Francisco in 1854.—

By Way of Alaska

It seems, however, that really the first introduction of bees into California was long before the time of Harbison. H. B. Parks, who spent some time in Alaska, gave some attention to the subject and found that bees were first introduced into Alaska in 1809, and later bees were taken from Sitka to Ft. Ross, in California, about the year 1830. (See American Honey Plants, pages 13 to 15).

F. C. P.

BBEEKEEPING IN HIGH WATER

By Jes Dalton

During the high water of last spring, I had inquiries from some of my customers like this: "Will the high water prevent you from filling my order for bees?"

The accompanying photograph, taken by me, will probably be interesting to the beekeeper who is unfortunate enough to be overflowed. This picture was taken at the apiary of Mrs. S. L. Winston, of Vidalia, La. Everyone living behind those great levees knew that the water was going over or through at some point. Realizing this, Mrs. Winston appealed to me for help. I visited her apiary two days before the great Weeccama crevasse, just above Natchez, Miss.

We decided to scaffold the bees; so two scaffolds, 7 feet high by 24 feet long, by 6 feet wide, were erected, and 25 colonies placed on them. This was no small job, because they were all three and four-story colonies.

When the crevasse water covered the whole parish and had come to a stand, I made a visit in a boat and took the photograph. After the water receded, the colonies were placed back on their old stands.

One point of interest in this story is the swarming mania that developed in these bees while in close quarters. Swarm after swarm left while the parish was covered with water, and this swarming kept up after the bees were carried back to their old stands. and still kept up, in spite of close extracting, until August.

The personal answer to the above question comes now. My apiary is located on the bluffs of the Mississippi River just 200 feet above high-water. It overlooks all of the overflowed portion of Tensas and Concordia parishes, and has access to thousands of acres of willow and tupelo gum along with the countless numbers of nectar-bearing trees and wild vines of the hill section of southwest Mississippi. We have so many nectar-producing vines and trees blooming at the same time in this country that it is impossible to get a distinct honey. I would call it a blend. About one in three years we have such a heavy linden flow that

These bees were saved from flood by placing them on the platform.

we can be sure of pure linden honey.

At this writing, February 2, I saw bees in full force after food from red-bud and elm. This morning, at sunrise, the bees were so thick on a cedar tree at my back door that I thought a swarm was out.

On January 28, I was sitting on the gallery in the hot sun, when I was surprised to see a swarm of bees come to a tree near me. They did not cluster, but went back to a small 3-frame nucleus in the apiary. I followed them and found the combs destitute of honey. I fed them five pounds of honey and they are keeping house nicely today. Bees very often leave a box when they have no honey. So far, this has been an open winter and my bees have used up nearly all of their winter stores, and I was delighted today to find the bees actively working.

(Perhaps another reason for the swarming mania which you report, in bees that were put upon scaffolds, may be found in the fact that their exact location was probably changed in every instance. So the bees "drifted" more or less from one colony to another, and this would excite them and cause them to leave the hives. Your little story is very interesting.—Editor.)

We have just finished a box of honey candies which was received from an eastern beekeeper. These candies were of good qualities, all of them chocolate dipped and containing comb honey or extracted honey mixed with nuts and chocolate in various proportions. It would rank well with any of the high grade candies which can be obtained. This candy sold for $1.00 per box, but we have no figures as to the cost of preparing it for market.

Mr. Allen Latham, of Connecticut, another easterner who has developed many unusual ways of disposing of his honey, says that he finds the making of honey candies a profitable enterprise in the winter months, and that he can dispose of much of his comb honey in this way, which is otherwise unsaleable. This is an interestin way to use honey, and many will find it profitable to learn how to make products of this sort.

WATER AND POLLEN FOR BEES

By H. F. Wilson, University of Wisconsin.

There is a discussion in the March issue of the American Bee Journal on water for bees by Mr. Dadant and Professor F. B. Paddock. In this connection, it will undoubtedly be of interest to beekeepers to know that the Wisconsin Experiment Station has carried on a series of experiments to determine the amount of water used by bees in the spring and we have found that as much as six gallons of water may be taken down by a single colony in addition to that gathered from the field between the first of April and the first of July. In these experiments we have noticed that when bees are not rearing brood the amount of water taken down is comparatively small, but immediately when brood rearing begins, the amount taken increases greatly. We are now preparing material for a bulletin in which we are recommending to our Wisconsin beekeepers that they have a water feeder on each colony of bees during the spring period.

There is no question but what bees will take water when given to them in winter, but there is some doubt in my mind as to the actual need of water other than that in the hive, either free or in honey.

We carried on some experiments in removing the pollen from bees in the spring and there seems to be very definite relation between the amount of brood reared and the amount of pollen present in the colonies. Removing the pollen from a colony of bees at a time in the spring when they are unable to get any from the field, seems to immediately cut down brood rearing.

Is it possible that bees make special provision for a supply of pollen in the spring by storing it in certain cells and covering it with honey? This is commonly done by the bees, but can we say the bees follow a regular practice of doing so? This is a problem which our beekeepers should look into very carefully and it is posble that within a few years, we will be holding over combs of pollen for use in the early spring in the same way that we hold over combs of honey.

HONEYBEES AND RED CLOVER

By O. A. Stevens, North Dakota College of Agriculture

The comment in the March number that honeybees are unable to cut open the flower of the red clover is hardly correct, either in fact or inference. That they do not do this habitually, possibly is due to to the fact that they find it easier to obtain their supply from other flowers. The fact that the elephant does not destroy his keeper is not proof that he is unable to do so. Are we not told that the workers use their mandibles to destroy the drones?

It is well known that bumblebees frequently bite into certain flowers to obtain the nectar. A summary of such data was published by Schultz in 1888. The writer has not access to that article, but as quoted by Knuth (Handbook of Flower Pollination) he reports that a total of 165 kinds of flowers have been so perforated, most of them by two species of bumblebees, but 11 are credited to the honeybee.

In fact, honeybees are reported biting into red clover flowers. (Knuth, Handbuch der Blutenbiologie, vol. 2, pt. 1, p, 293). Similar accounts are given regarding alfalfa, garden columbine and several other flowers, but the cases appear to be comparatively rare. The honeybees more frequently use holes made by bumblebees. Perforations by wasps seem not to be mentioned in the general account of the same

In this country a few additional cases are recorded, Lovell mentioning repeated perforations of touch-me-not flowers by honeybees. I notice, also reports of perforations of this flower by hornets and of wild bergamot by one of the solitary wasps closely related to them (**Odynerus**).

Lovell states (The Flower and the Bee, p. 96), that the punctures of the bumblebees are made by the maxillæ, not the mandibles.

HONEY AS A PRESERVATIVE

By William A. Braun

Honey was used by the ancient Greeks and Romans to preserve fresh fruits till they were desired. The method used was to immerse the fruit in honey-filled vessels which were covered over so as to keep out all foreign matter. This is extremely simple, but, nevertheless, reliable and economical.

To test the worth of this novel way of preserving, a few pears were put into a fruit jar and sufficient honey, warmed enough to flow like oil, was poured over them to completely cover them. After being in the jar for several months they were removed and found to be sound and as solid as when placed there. Vegetables having shells can also be kept fresh and usable by the same treatment. Several cantaloupes were put in a large earthen jar. They were taken out on Christmas and found to be in as good condition as the pears. It is essential not to use over-ripe fruit; the results will be better, as a hard article taken out of the immersion, can be kept in the air for a time before decay sets in.

Sweet corn from which the husks have been removed, watermelon, and other choice articles can be put away during their season and used as wished. This makes it possible to have cheap fresh fruits and vegetables for the table on Christmas, Easter, or any other day. None of the honey need be wasted.

One feature of this method is the fact that the honey seems to seal the flavor. Perhaps other ways are also satisfactory in preserving fruits, but this one requires the least effort. I suggest that a small amount of fruit be preserved by honey raisers first, so as to get the ideas properly grounded. I am going to try the experiment this coming fall on grapes, peaches and plums. Let us all get together and help boost the market for honey.

Wisconsin.

Bees Sting Pony to Death

Streator, Ill. — Infuriated when their hives were tipped over by a pony, three swarms of bees attacked and soon killed the animal at the farm of Albert Brandes, near Manville. Mrs. Brandes rushed to the animal's aid and was so severely stung and poisoned that she fainted. She was rescued by neighbors.—Otsego, N. Y., Times.

"Open House"

Wisconsin beekeepers will keep "open house" during their fifth annual conference at Madison, August 19 to 18. The entire conference will be dedicated to Dr. Charles C. Miller, one of the greatest and most beloved of beekeepers. All of Dr. Miller's friends and admirers are invited to be present and take part in the events of the week.

The Dr. Charles C. Miller Memorial Apicultural Library, which is now a part of the Wisconsin Agricultural Library, will be dedicated on Friday, August 17. Contributions to this library have been receivvd from many countries, so that it is an international monument to the beekeeping industry as well as Dr. Miller.

A pilgrimage by automobile to the former home of Dr. Miller at Marengo, Ill., will take place on Saturday, August 18. A special service will be held there and a tablet in memory of Dr. Miller placed in the church where he conducted a Sunday school class for many years.

All of Dr. Miller's friends, whether beekeepers or not, are invited to attend the ceremony at Marngo. The pilgrimage will start from Madison at 8 o'clock Saturday morning via Evansville, Jamesville, Beloit, Rockford, and Belvidere to Marengo, Ill. Friends from Chicago and other parts of Illinois may come by way of Elgin. Chicago friends may go direct to Marengo by trolley or the Northwestern railroad.

Everyone should plan to be in Marengo at 1 p. m. for the basket lunch. The ceremonial service in the church at 2:30 p. m. will be followed by an outdoor reception at the home of Dr. Miller at 3:30. Directions for reaching these places in Marengo can be secured at the Northwestern station.

For complete program for the five days, write to Prof. H. F. Wilson, State University, Madison, Wis.

Co-operative Marketing Law

A new law concerning the co-operative marketing of agricultural products has recently been enacted by the state of Colorado. The law provides that no firm or corporation shall use the term "co-operative" in connection with its business unless it shall be actually engaged in handling the products of its members in accordance with the provisions of this law. This provision will serve to enable the public to know when they are dealing with producers selling their products co-opratively.

The law is designed to remove the difficulties which have heretofore interfered with the operation of such organizations and to facilitate the joint marketing of agricultural products by groups of producers.

Some Long-Time Readers

From our recent correspondence we find that many of our subscribers have been regular readers of the American Bee Journal for many years. There are no friends like the old friends.

Mr. Edwin Hutchinson, of Avon, New York, writes that he has taken the Journal for more than 30 years. Mr. Charles Alberts, of Sun Prairie, Wisconsin, has taken it more than 20 years. Mr. C. E. Teetshorn, of Ridgeway, Iowa, has been a constant reader for more than 50 years, which reaches back to near its beginning, since it was founded in 1861, or 62 years ago last January. Mr. F. A. Snell, of Milledgeville, Illinois, has been a reader since 1867, and we wonder whether there is anyone living who has read it since the beginning. We are glad to hear from those who have been constant readers through the years and especially interested to know how many now living have read our paper for 40 years or more.

A Good Publication

The report of the State Apiarist of Iowa for 1922 has just reached this office. It contains 80 pages of very interesting and practical matter, together with some very good pictures. Some of the subjects treated are as follows:

Beekeeping in Manitoba, Practical Significance of Life History, Relation of Queens to Seasonal Management, Profit in Requeening, Rearing Good Queens, The Great Menace to Beekeeping, The Foulbrood Situation, Outdoor Wintering in Iowa, Starting in Beekeeping, Millions of Honey at Our House, How I Saved Money on Equipment, Equipment and Management, The Marketing System, Marketing Honey, Turning Honey into Money, Pollination of Interest to Beekeepers, Winter Food Requirement of Bees, Notes on Wintering, Some Pollens Gathered by Bees, Flight Studies of the Honeybee and Demonstration Apiaries in Iowa.

From the above list of subjects, each of which is treated by a well-known beeman, it will be seen that several evenings can be profitably employed with this report. The supply is limited, but while they last they will be sent free to interested beekeepers on application. Write to Prof. F. B. Paddock, State Apiarist, Ames, Iowa.

Mrs. Pellett Passes on

Mrs. Ambrose Pellett, mother of Frank C. Pellett, junior editor of the American Bee Journal, died very suddenly of heart failure at her home near Atlantic, Iowa, on May 10. Mrs. Pellett was near her 78th birthday and had kept her home and did her own work to the last day of her life. Her father, B. F. Chapman, was a beekeeper and it was from him that the junior editor learned his first lessons and found his first interest concerning bees. The Pellett family has occupied the family home for 48 years, having come to western Iowa early in the period of development. Her aged husband and three sons survive her.

What Did Dr. Miller Do for You?

In connection with the dedication of the Miller Memorial Apicultural Library at the University of Wisconsin on August 17, 1923, it would be a pleasing thing for each person who has been helped by Doctor Miller's life and work to record this. Those interested are asked to write a one page statement entitled, "What Doctor Miller Did for Me."

Please use paper exactly 8x10½ inches in size, and if possible the statements should be typewritten, although this is not necessary. A margin of 1½ inches should be left on the left-hand side. Statements should be dated and signed legibly and mailed to Professor H. F. Wilson, University of Wisconsin, Madison, Wis., but please do not expect him to

acknowledge them. These statements will be bound and placed in the Library as a testimonial from Doctor Miller's friends. Do it now.

American Honey in Sweden

American honey seems to be in bad with the housewives of Sweden. When there was a temporary dearth of sugar and butter in that country in 1918 and 1919, large quantities of honey from the United States were imported, but dealers informed Consul Walter A. Leonard, Stockholm, that it was not of the highest quality and many complaints were made that American honey, as a whole, is not up to the standard of the Swedish honey. The Department of Commerce feels, however, it is probable that considerable inferior honey was imported from America for speculative purposes and that it was not of the highest quality. California honey imported into Sweden during the last few years has shown a decline, due chiefly to increased Swedish production. It is believed that if California and other American honey of the best quality was sent to Sweden it would undoubtedly find a market and remove some of the objections now in the minds of the Swedes.

THE EDITOR'S ANSWERS

When stamp is enclosed, the editor will answer questions by mail. Since we have far more questions than we can print in the space available, several months sometimes elapse before answers appear.

MATING SWARMS

I had a strong colony that raised a supersedure queen, and on three occasions, as she came out for her wedding flight, late in August, she brought out a large swarm which clustered for a time and returned to the hive. They finally came out unnoticed and left, for we found the parent colony quite depleted about a week later, and a neighbor found a large swarm. I had a similar experience a year ago. Is it a common occurrence for virgins to bring out swarms in this way? I like to requeen by giving queen cells, but it seems to me to be somewhat risky if they frequently take off swarms. ILLINOIS.

Answer.—This accident happens quite often when the bees have no brood, or when the remaining brood is too old to enable them to rear another queen from it. But as a rule, it happens only in swarming time. It is a good plan to give a queen-rearing colony a little fresh brood when the young queen is about to emerge. We have rarely had any trouble except with late casts, secondary or third swarms.

HONEY-CURED MEAT

I would like to have the recipe for curing home put up meat with honey, the honey-cure recipe. I saw it in the American Bee Journal several years ago and cured a good deal of meat. I was away from home and lost it. ILLINOIS.

Answer.—For sugar-curing a hundred pounds of meat: Eight pounds of salt, one quart of honey, two ounces of saltpeter, and three gallons of water. Mix and boil until dissolved, then pour it hot on the meat.

QUEENS TAKING FLIGHT

I was in conversation a few days ago with a beekeeper and we were talking about a queen disappearing in winter. He made the claim that queens would take flight in winter when they were not laying eggs, and would likely be lost on such flights. With us here in the South, bees take flight on warm days, and often the queens quit laying and have nothing to do; is it likely that they would venture out? ALABAMA.

Answer.—The only time when queens are known to fly out is when in search of a

drone, for mating, 5 days or a week after birth, sometimes a little later. Outside of that, they go out only with a swarm. But bees may desert their hives in the winter, if short of stores or if the hive has become foul from moisture or disease. In each of these cases the queen goes along.

As to a queen going out for a flight at any time without any escort, that is possible only when she is a virgin. At least that is our experience, and the experience of all writers.

MOTHS

Will you please tell me how to keep moths out of my bees? I have painted my hives white. If they were painted some other color would it make any difference?

ARKANSAS.

Answer. The color of the hive will have no more effect upon the invasion of the hive by moths than the color of a cow would have upon her body being infested by carrion maggots, if the cow was wounded to death or dying.

Mr. L. L. Langstroth was the first beekeeper who made the comparison between the carrion fly and the bee-moth. If a cow, or any other animal, dies in the summer, within a very short time the dead body will be eaten up by maggots from eggs laid by the carrion fly. It is the same in the case of the colony of bees. A healthy colony of bees is in no danger from moths, for her bees will carry the grubs out as fast as they hatch, but a dead or dying colony will be like a dying cow, subject to the work of those insects which only consume the remains.

The reason why so many people imagine that the moths destroy colonies of bees is that, as long as there are any bees in the hive, after the death of the queen, those bees cluster at the entrance of the hive and make the colony appear strong, but an investigation of a queenless colony would show that the bees are all on the outside, trying to defend their hive against the moth. But at night they go back inside and then the moth comes and lays its eggs on the edge of the combs.

The only way to prevent moths from destroying the combs of a hive is to keep that hive strong in bees, by making sure that they have a good queen, plenty to eat, and not any more combs than they can conveniently cover during the summer, when moths are most numerous. Even a small swarm may be kept safe from moths if it does not have more combs to care for than it can cover.

I advise you to purchase a textbook on bees. You will find in it enough to pay you many times for its cost, if you expect to keep bees in the future.

EXTRACTOR FOR STORAGE

1. I recently purchased a Cowan reversible extractor from Dadant & Sons. I extracted a small amount of white honey and left it standing in the extractor so that the scum could come to the top. I intended to leave it there until I wanted to bottle it, which will be in about two weeks. I later read in Doctor Miller's "Thousand Answers" that the honey might be injured by being left in an extractor. As the tank is galvanized and the baskets are tinned, I could not see where any discoloration could come from. I had intended to use the tank as a storage tank. Will this be all right? I thought that maybe the older extractors were not galvanized or tinned, which would account for Doctor Miller's answer.

2. Would it hurt to extract honey from brood combs in which brood had been raised and mix it with white honey extracted from the extracting combs? I mean would the quality of the honey be hurt?

ILLINOIS.

Answers.—1. The objection of Doctor Miller to leaving the honey in the extractor is probably the same as a housekeeper would have to keeping a prepared dish in the kettle in which it was cooked, without wiping the soiled edges of the kettle. When you run the extractor, the honey is daubed all over its inner walls and the screens of the cage This may gather dust or moisture, or both. Besides, if there is any part which is not fully tinned, that part may color the thin coat of honey which covers it. Therefore, we would prefer removing the honey, washing the extractor with hot water, and if we see fit afterwards, pour the honey back into the extractor tank and keep it there as long as we care to do so. The tank may be covered, in fact it should be covered, so as not to draw dust or moisture. We have used extractors as storage tanks, by removing the inside works.

2. We have extracted the very whitest honey from brood combs of dark color. There may be times when bees put honey too promptly in combs from which the bees have just emerged, but as a rule they burnish those combs before putting honey in them and the honey is not colored at all. That, I think, is the rule with them.

REQUEENING

I have some strong colonies with old queens that I am going to requeen this fall. How would it be to kill old queens at the beginning of buckwheat flow or a little before and leave them to themselves? Would they be liable to swarm when the young queens hatch? Our buckwheat flow lasts about five weeks.

MINNESOTA.

Answer.—Unless you usually have swarming at buckwheat blooming time, it will not be likely that those queenless colonies will swarm because the season then is quite advanced.

However, I have another objection to your plan. When you change your queens, it is a good time to improve your stock, by breeding your queens from the best colony in your apiary. So if I were to do what you propose, I would make the best colony queenless first, after having made sure that the queen laid some eggs in fresh built combs, cut in the manner followed by Dr. Miller, so as to have plenty of chances for the building of queen cells in that colony. Then, on the ninth day after removing the queen, count your queen cells and remove as many as you have queen cells, less one to leave in this colony. The next day, or the tenth day after the first queen removal, introduce a queen cell in each of those queenless colonies, placing it in the center of a comb of brood. You will succeed in nine cases out of ten, at least, in securing queens from your best breeder, by following this method.

If there is any danger of swarming, be sure and remove all queen cells that are not needed.

EXCLUDERS—NUCLEI

1. When shallow supers are used, 5⅜ frames, is a queen excluder necessary?

2. In forming nuclei, when dividing hive bodies into compartments, if they were divided with excluder zinc, putting brood in one or more compartments, would it keep the bees from absconding with the queen when on her honeymoon?

3. In making baby nuclei, three frames to fill a Langstroth frame ("Queen Rearing," page 35 by Frank C. Pellett) when taken out of the frame will it make any difference to the brood to turn it so the longest side of the little frame will be horizontal?

NOVA SCOTIA.

Answers.—1. The answer depends entirely upon the prolificness of the queen and the size of the brood chamber which is at her disposal. If the brood chamber is small and the queen prolific, a queen excluder may be necessary.

2. I do not know, have never tried it. But usually when there is plenty of brood left in the hive, the bees do not abscond.

3. No, the turning of the brood combs, even wrong end up, will not prevent the brood from hatching normally.

HONEYDEW—STRAW SKEPS

1. Mention is often made of honeydew honey as not being good for bees to winter on. Now I would like to ask you how one may know honeydew honey from good honey, and if it is not good for the bees, what is it good for?

2. From time to time there appear in the American Bee Journal pictures of apiaries in foreign countries, from England, Germany and Russia, where bees are kept in straw skeps; does that indicate that there is not so much foulbrood in those countries, or can that disease be controlled with bees in straw skeps?

MICHIGAN.

Answers.—1. Honeydew, as it is understood in this part of the world is a dark substance ejected by aphides, which is just sweet enough for bees to gather it. It contains a large proportion of foreign substances and therefore loads the intestines of the bees if they have to eat it when confined to the hive. It is easy to detect it, as it is about the color or molasses. It is used in tobacco factories or for cooking.

2. Where bees are kept in straw skeps or immovable comb hives, the mortality from foulbrood is very much greater than in the countries of movable-frame hives, for they rarely detect the disease before they can smell it from the outside. As a rule their writers have no positive methods of curing foulbrood. So the disease usually destroys everything in the localities where it exists and the disease disappears for want of fuel.

THICKNESS OF COMBS

1. I desire to know how close, center to center, brood frames can be spaced so as not to interfere with brood rearing. In other words, I want to space frames as close as I can, so as to get as thin combs as possible, above the brood, in that part of the comb where bees store honey in a brood comb.

2. What is the thickness of a brood comb? How much space is left between combs when the combs are sealed, i. e., when sealed honey is in the combs above the brood in a brood frame?

INDIANA.

Answers.—1. As the combs of the bees, worker combs, are ⅞ to 15-16 in thickness, and the bees require not less than ⅜ for a passage, combs cannot be placed closer together than 1¼ inches, and even then, as the combs thicken with age, owing to the cast skins of the bees piling at the bottom of the cell when brood is raised, it has been found wise not to space combs less than 1⅜ from center to center.

2. Your second question is partly answered above. But the sealing of comb does not always leave an absolutely regular interval between them, though ⅜ is a good average. We prefer to space the combs of the super more than 1½ inches, because the queen is less apt to go into deep cells. In fact she does not lay eggs in deep cells and the bees have to cut them down, if they wish her to lay in them.

METAL COMBS—BEE BOOKS, ETC.

1. I have read advertisements of aluminum comb. I have not seen it or used it and would like to know if you advocate the use of it.

2. What is the best method of clipping a queen bee's wings?

3. What books do you think best for the amateur beekeeper?

4. From what plant is the honey most expensive?

MINNESOTA.

Answers. The aluminum comb appears to prove very satisfactory in warm climates, for it is highly recommended in Texas, especially for storing honey. In our part of the country it has proved very indifferent in quality, the bees in a hive where those combs are placed usually putting all wax combs to use before they take possession of the aluminum combs. We would advise you to try a set of them, so you may learn whether they will do in your locality.

2. Concerning the clipping of queen's wings, Dr. Miller, who probably did as much of it as any one, wrote:

"Mr. Doolittle catches a queen by one wing, lets her hold to the comb with her feet, and with a very sharp knife cuts the wing against the thumb and finger. Probably a larger number, myself in the number, use a pair of scissors, holding the queen by the thorax (not by the abdomen or hinder part) between the thumb and finger of the left hand and cutting most of the two wings on one side." (A Thousand Answers to Beekeeping questions, page 174).

We have used both methods; both are good.

3. It will hardly do for me to answer that question, since I am an author myself. Outside of our own works, the A-B-C, which is an encyclopedia and not an A-B-C; Phillips' Beekeeping, and Pellett's Productive Beekeeping, are among the very best books.

4. I cannot understand that question. Honey is expensive when there is but little of it in the blossoms and that happens to any flowers, at some time, according to the season.

DRONES

In going through my bees I found a large number of drones and drone cells; will you please tell me the cause and what to do?

CALIFORNIA.

Answer.—Your enquiry is not very clear. Do the bees have much drone comb, or did the queen lays eggs mainly in what drone comb there is, or is there drone brood in worker cells also?

If the bees have too much drone comb, remove it and put worker comb or comb foundation in place of the comb removed.

If the queen hunts for drone cells, and neglects worker cells, it gives evidence that she is getting old and must be superseded.

If there is drone brood in worker cells as well as in drone cells it indicates that the queen is a drone-layer or that there is no queen but a lot of drone-laying workers. Sometimes colonies with drone-laying workers will accept a queen if she is fresh from another hive and in good laying activity. Usually we preserve a worthless hybrid queen which we wish to do away with, for the benefit of a drone-laying colony and kill her after she has brought that colony to normal.

In any case, be sure to remove all the drone comb that you do not want and replace it with worker comb. If you did not do that, they would probably rebuild drone comb in the same spot.

ORANGE LOCATIONS—CORN HONEY

1. There are several large orange groves near me, (5 to 10 miles) and I would like to establish a bee yard near each of the groves. Do you think it would pay, as the oranges bloom such a short while?

2. What arrangements are generally made in this case? How much honey or what price would be fair to offer the owner of the groves?

3. Does corn produce any honey, and if so, what is the quality?

MISSISSIPPI.

Answers.—1. You do not state how large those groves are. If they occupy a hundred acres or more, it might pay to move the bees near them. If only 4 or 5 acres, it would probably not be worth while.

2. I do not believe the beekeeper should pay anything for the privilege of having his bees work upon the orange bloom, because the profit is mutual. The bees help the oranges to set. That has been well proven in case of nearly all fruits. At Manatee, Florida, the Atwood Grape Fruit Ranch induces beekeepers to locate near, to insure the fertilization of the bloom. You will find this matter mentioned on page 229 of the July, 1918, number of the American Bee Journal. At any rate, the owner of an orange grove ought to be glad to get bees near his trees.

3. Corn produces a great deal of pollen, but whether it yields honey, also, is a debated question. At any rate, it has never been known to furnish surplus honey. But there are times when it looks as if every blossom yielded honey, and some people have advanced the joke that, at these times, even fence posts would produce honey.

PINE HONEY

A friend has told me about some honey which she obtained in Europe and which was called "Pine Honey." Do any pines in Europe or America yield nectar, or might it have been "honeydew"? It was very dark—almost black.

2. Can you tell me if there is a great difference in the chemical composition of light and dark honey? Would clover honey, for example, be easier to digest than buckwheat?

ONTARIO.

Answers.—1. There is considerable honeydew furnished by pines in Europe, especially in Switzerland. Probably the honey to which your friend referred is of that kind. Some people hold that it is, like our honeydews, a product of the plant lice; others say that it is an exudation from the leaves. It is mentioned in the "Revue Internationale D'Apiculture" for 1893, page 121, and also in 1902, page 153. It is said to be very dark.

2. We do not know what difference there would be in the digestibility of these honeys, as compared to clover. The dark honeydew of Switzerland is said to contain a great deal of dextrin, which is healthy enough for human beings, but very bad for bees confined to their hives in winter,. The Swiss seem to be very fond of the honeydew from the pines.

Embargoes and Duties

So the Germans claim that their embargo on American honey was caused by our embargo on their queens and bees. Looks like probably our duty on honey might have a sneaking influence somewhere. A duty here means a corresponding restriction with the other fellow. We ride the Democratic mule and cut our tariffs, we change to the Republican elephant and put them back on. Our medial line remains about the same. One wonders what would happen if all countries adopted a policy of friendship and free trade.

We've likely profited by the new duties now in effect—undoubtedly we have—but how long will they be an advantage?

More Bee Specialists

We expect to graduate, this year, 15 men, each of whom has taken an option of four terms of bee work under Professor R. H. Kelty, and who have become apicultural specialists. These 15 men will get their degrees of B. S. at the time of graduation.

We have also sent out a class, this year, consisting of 51 students who have taken as much or more bee work but who will not receive degrees, being Federal Vocational Training students. All of these men, of both classes, expect to make apiculture an important part of their life's work.

R. H. Pettit.
East Lansing, Mich.

OVERSTOCKING ORANGE LOCATIONS

By A. E. Lusher.

It has been said a number of times that the orange groves of Southern California couldn't be overstocked with bees. I was sure they could be overstocked, for the thin honey must collect in the blossom and let the air and sun evaporate most of the water if the bees make any showing of honey in the hive. If there are too many colonies of bees in any locations they carry in this thin stuff and have all the work for nothing, for there is about one-half pound of honey the next morning, after working hard all the day before, bringing in 15 or 20 pounds. Years ago, when we first moved to the orange groves, the bees averaged about 120 pounds to the colony. The last five years the average is running about 40 pounds for most of the beekeepers. Unless the bees average 60 pounds they won't pay for the expense of moving and the rent of the location. The ground is getting too valuable to rent to beekeepers at small rents, so if you have a good location you have to pay $50, $75, or $100 for three months' rent. Even then it is nothing to have 5,000 or more colonies in bee flight of each other, causing a shortage of pollen in the spring just when they need it the worst. The orange tree blooms about six weeks. The first two weeks the bees don't work the bloom, for the honey is too thin. The third and fourth weeks they just go wild and swarm. The last two weeks is when they make most of the honey, if it isn't foggy or raining. Just because you see a lot of bloom on an orange tree is no sign the bees are making honey.

The groves next to the mountains and in a gravel soil bloom first because the ground warms up early and it is warmer near the hills. All the sick trees and played-out groves bloom next. Last of all are the groves in the heavy clay soils, lower in the valley, where the nights are cool and frosty late in the year. Some beekeepers get left when they rent a location that blooms late, and then they can't move to the sage, losing half a year's honey crop.

Some locations have a cold draft from the mountains at night, that also holds back the bloom until the foggy month of April.

California.

Copy of Certificate of Inspection

The following is a copy of the Dominion Postal Regulations with reference to the shipment of queens and bees through the mails in Canada:

Live Bees

"Queen bees, and their attendant bees, when accompanied with a copy of a certificate of the current year from a Government Apiary Inspector, to the effect that the apiary from which the said queen bees are shipped is free from disease, or by a copy of a statement by the beekeeper, made before a notary public, or other officer having a seal, that the honey used in making the candy used in the queen mailing cage has been diluted and boiled in a closed vessel, may be sent in the mail, when so put up as to render it practically impossible that the package shall be broken in transit, or the persons handling it be injured.

"Honeybees in quantity may be sent in the mails under the same conditions as are prescribed for queen bees and their attendant bees, when delivery can be made to the addressee within a period of five days. If the cages are wooden, the material of which they are constructed shall not be less than three-eighths of an inch thick, and the saw cuts therein, or space within slats, shall not be over one-eighth of an inch wide. If wire screen is used for the sides of the cage there shall be two thicknesses of screen separated by slats at least three-eighths of an inch in thickness. The container shall be provided with a suitable handle, and no honeycomb, water or liquid food shall be placed therein. Such parcels shall be transported outside of mail bags."

New Correspondence Course

The New York College of Agriculture at Ithaca, N. Y., has recently arranged to offer a correspondence course in beekeeping along with others. The farm study courses include farm management, orcharding, poultry, sheep and wool, floriculture, dairying, vegetable growing, pork production, etc.

REAL EFFORTS TELL IN QUEEN-REARING

For more than 20 years I have made every effort to improve my stock of bees, both by purchase and by selective breeding.

Although color has its place, it is of secondary importance to gentleness, hardiness and honey-producing qualities. These are what I stress my efforts upon, maintaining only pure Italian stock in or near my yards.

My queens are built in the second or third story of big, strong colonies, under most favorable conditions, selecting only the best to breed from.

Safe arrival guaranteed by me.

My prices are as follows:

Untested, 1, $1; 6 for $5.75; 12 for $11; 50 for $45, or 100 for $85. Tested queens, 1 for $2, 6 for $11.

I can make prompt shipments.

J. D. HARRAH,
Route No. 1, Freewater, Ore.

WATER FOR BEES

By Elias Fox

My bees, as a rule, begin brood-rearing by or before the first of March. While the death rate of old bees during the winter for several years' keeping tab averages a pound or more per hive, so far as I can determine they are just as strong in bees when set out of the cellar the latter part of March or fore part of April as they were when put in about the middle of November. They make up the winter loss while in the cellar, and without water, except what is contained in their honey, and possibly a little condensation on under side of oilcloths.

When set out of the cellar they are simply wild to get water and if the ground is wet it will be practically covered with them, sucking up and carrying water in the hives, and they continue to carry it the entire season as long as there is brood in the hives.

Whatever bees may do relative to storing water in combs, queen cells or burr combs in other countries or places, they certainly do not do it here. At least in my 40 years in the business I have yet to see the first drop of water stored other than that contained in the raw nectar. During the months of April and May, when we frequently have three or four days, or even a week at a time when it is rainy or chilly, you will see them sucking it up at the entrance of the hive.

SHIPPING QUEEN BEES

By C. H. Smith

The too common practice of marking the breeders' name on mailing cases is, in many instances, a reflexible policy, because many people who are buying queens from several breeders at the same time, promiscuously, place much import on the failure of acceptance, in the fact that the queen comes from such and such breeder.

I have witnessed numerous queens, furnished by careful breeders (splendid-looking queens) held by the purchaser, in his house or on a shop window sill, for two weeks or more, before any attempt at introduction was made. Finally some colony of blacks or hybrids was marked for requeening and the queens positively slaughtered by the practice of hunting up the old queen, destroying her and then placing these debilitated queens—in the mailing cage in which they were held—immediately in the hive, where they would invariably be freed too soon, because the candy was nearly all consumed, and on the next visit a young hybrid, or worse, is found. If she be laying (even though she be of a different color from the queen received in the cage) the breeder, whose name is found on the cage, will be called to task and blamed for all this mismanagement.

I have witnessed a man, who should know better, take a laying queen from a weak nucleus and throw her in the entrance of a colony which was found queenless on the preceding inspection, and of course this queen was promptly destroyed.

There are beekeepers who buy queens for neighbor beekeepers, and try to keep a supply on hand. They keep some of them lying around for weeks before they get a request for some of them and, of course, they hand out the ones which have been lying around the longest, and non-acceptance is the usual result, when they are placed, as before mentioned. Now, is it not evident that the date on which the queen was caged should be placed on the cage?

Another important warning is that against the practice of shipping in too large packages or bundles.

Packages should be no larger in their greatest dimension than the smallest dimension of the smallest letter box found in any rural service. If the package is too large for the box (which is, in many cases, partly filled with other mail) the postman will leave the package on the outside, in the sun or rain, either of which will do irreparable harm.

There should be a notice for postmen on every side of each package, telling him not to leave outside of the mail box.

An enormous percentage of failures in introduction are due to too meager a study of the colony condition at the time of placing the queen.

From my experience in queen breeding in the South, and general bee work in the North, I can say that the queens or the breeders are very seldom open to censure for any of the buyer's troubles.

These losses by mismanagement are often made good by the breeder when in fairness the bungling should be paid for by the bungler. We often send on the queens without question, fearing the loss of a customer, yet that same customer is blaming us for his own shortcomings.

Let us pull together and make an earnest attempt to get a fair deal.

New York.

More Sweet Clover

It is gratifying to honey producers to hear an increase in favorable talk about sweet clover. At a recent meeting of the Woodford County Beekeepers' Association, Illinois, the County Agent said that the Co-operative Seed Association of the Farm Bureau had sold, this year, five times as much sweet clover seed, both biennial and Hubam, as of red clover. County associations everywhere can help a great deal by collecting and spreading information and, through their Farm Bureaus or County Agents, starting demonstrations of the value of sweet clover in the farm.

More Hive Sizes

And now a patented cylindrical hive by a man in Kansas. If it is adaptable to present equipment, at least the large and small hive man should be satisfied. If the large hive principle is desired, use a 100 gallon water tank; if the small hive, a paper wad shooter. The long idea man can buy some second-hand road culverts or boiler flues.

AID FOR THE BERLIN BIENEN-INSTITUT

The Berlin Bieneninstitut, under the direction of Dr. Ludwig Armbruster, has produced some excellent research work in beekeeping. Dr. Armbruster is also editor of the Archiv fur Bienenkunde, the only strictly scientific journal devoted to bees and beekeeping in the world. Through this journal and through the work of the Institut, he and his associates have been active in advancing the methods of beekeeping perfected by American beekeepers among German beekeepers. This institute and the men connected with it are now in great need, because of the economic conditions in Germany, and in order to continue their valuable work for beekeeping and to prevent acute suffering on their part, it is proposed to send such funds as may be contributed by American beekeepers to the director, to be disbursed by him personally. It is quite unnecessary to attempt to analyze the complex causes of the present economic conditions in Germany or to try to place the blame for them. It is clear that the scientific men of this institute are not to blame, and that they are in great want. As beekeepers who wish to see this important research work continued with as little interruption as possible, and who desire to further good-will among beekeepers everywhere, the undersigned are undertaking to transmit such funds as may be sent in by persons interested in this cause. Because of the depreciation of the mark, only a few American dollars a month will now suffice to maintain this Institute, but since the number of persons interested in work of this character is small, it will be necessary for each one to contribute as liberally as possible if we are to be able to render any real aid. If sufficient funds are obtained, aid will be given other scientific investigators in Germany who are in equal need of help.

Persons interested in this work are invited and urged to send contributions to any of the undersigned as soon as possible. Funds received will, unless otherwise specified by the donors, be divided into twelve equal parts and monthly installments will be sent during the next twelve months. Should the continuation of aid be found unnecessary during an entire year, any funds remaining will either be returned to the donors or sent to the Miller Memorial Library endowment fund. Unless otherwise requested, it will be sent to the library. The chairman of the undersigned committee will act as treasurer.

Respectfully,
E. F. Phillips, Bureau of Entomology, Washington, D. C.
H. F. Wilson, University of Wisconsin, Madison, Wis.
J. H. Merrill, Agricultural College, Manhattan, Kans.

New York Federation

The Empire State Federation of Beekeepers' Co-operative Association, Inc., will hold their annual summer meeting and picnic at the apiary of Mr. J. F. Miller, Mottville, Onondaga County, Friday, August 3, 1923.

Many prominent speakers will be present to address the meeting. One of the features will be a number of practical demonstrations of actual apiary work.

Programs may be obtained by addressing the Secretary.

O. W. Bedell, Sec'y.

Western New York Meet

The Western New York Honey Producers' Association will hold their annual summer meeting at the home of John W. DeMuth, of Pembroke, N. Y., on Wednesday, August 1, 1923. A very interesting program has been arranged and this promises to be th elargest field meeing in the tsate.

John N. DeMuth, Sec'y,
Ransomville, N. Y.

An Error

Our attention has been called to a serious error in the article on "Effect on the Honeybees of Treating Cotton with Calcium Arsenate," by by N. C. McIndoo, page 285 of our June number. In line 15 of the third column the statement is made that "does **do** perceptible damage." It should be does **no** perceptible damage.

TRANSFERRING

By W. H. Brown.

First obtain a water tight tank or vessel, as deep as the old gum. The next step is to set the gum in the tank, and place a box on top to drive the bees into. Slowly pour water into the tank, and as water will seek its level it will rise inside the gum and drive the bees up into the box. Care should be taken not to fill the tank too fast, as the bees will be slow to leave the brood, and some will get into the water. But this will do no serious damage, as they can be dipped out of the water with a piece of screen wire, and dumped with the rest of the bees, where they will quickly dry. When the water has raised to the top of the old gum, or a little above, the bees will all be found in the box on top, and all you have to do is to lift them off. Now place a frame of brood in the new hive with drawn combs or sheets of foundation, put on a queen excluder, and on top of this set the old gum, making all bee tight, so the bees will have to work out through the hive entrance. Dump the bees from the box in front of the new hive, and you have the trick complete. In 21 days put a bee escape under the old gum, and in a day or two you can lift it off with scarcely a bee left.

If the water used has been slightly warmed, and you work fast, the brood will not be hurt, and the bees will soon dry off the water that remains on the combs. I always take the bottom off the old hive and give it a good shake, as this will get rid of most of the water that clings to the combs. Now this refers to where one is sure there is no foulbrood. Where foulbrood is found, I take the old hive or gum out of the tank and burn it. Neither do I give a frame of brood in the new hive when treating foulbrood, only starters are given, and I cage the queen. After five or six days the same method is used in transferring to full sheets of wired foundation. And as no smoke is used there is very little danger of the bees taking any honey with them at the second transferring.

Givin, Iowa.

Crop and Market Report

Compiled by M. G. Dadant

For our July report we did not send out any letters to our reporters, but expect to have a very full report by August 1st. Weather conditions have been so backward that we felt that it would be impossible to get a satisfactory report on honey conditions in all sections of the country.

Reports coming in to us from beekeepers in different parts would indicate that conditions are backward everywhere and that the honey crop, as a consequence has been very short.

In California the orange crop is not over 20 per cent of normal, while in Texas the early crop has been, in parts, a failure also.

In the South, where they usually have a good proportion of their honey harvested by this time, the total harvest has not exceeded twenty pounds per colony from the early flowers. Of course, the later flowers are to be heard from, but indications are at this date that the whole south half of the country, as well as California, will rank considerably under last year. In fact, the Californians are now thinking that they will be lucky if they can get through the year without buying back some of their early honey.

These conditions are especially true in southern California, which has had the shortest crop, while they are slightly better in central and northern California.

The Central West, as a whole, seems to have suffered from too little moisture, so that such clover as there was earlier in the season has not stooled out sufficiently to make a good crop. In our own locality, we expected a fair crop from clover, but this does not seem to be materializing even at this late date, June 19.

Bees are gathering a little here on honeydew, just enough to keep them coming.

Nebraska, Kansas, the Dakotas, Minnesota, Wisconsin and Michigan seem to have very fair prospects, but these are practically the only sections of the country as far as we have had reports that expect to have a normal crop this year.

The amount of moisture throughout the Central West is still much less than usual at this time of the year and the condition of honey plants is much below normal.

The lateness of the season has had one effect and that is, that the weak colonies and "spring dwindlers" that looked like they would not be of any value this year, have all built up in excellent shape.

In fact, the reports we have had from practically all sections of the Central West and East are to the effect that bees are now in excellent shape, extra strong, and that a considerable number of swarms may be expected.

The Honey Prices

Honey has been gradually selling out in all sections of the country. There is little or no honey left in California or Texas, and the carloads held in the Inter-mountain territory are being rapidly disposed of in the western markets.

Probably the largest amount of honey still held may be found in the hands of either the large producer in the Central West who does not know exactly where to find his market, or in the hands of the wholesaler of honey who had a large stock and is not finding any outlet through the regular channels.

Large quantities of honey from Utah and the Inter-mountain territory have gone at a price of 7½c to 8½c in carload lots.

With sugar selling at $10.25, wholesale, in the Central West, it is not surprising that a large number of manufacturers of sweets should consume considerable quantities of the honey that is sold.

In the case of the wholesalers, we believe that they are a little slow in disposing of their stock at a sacrifice price, with very little profit, believing that the honey market will gradually improve until fall, when they can dispose of the old crop as well as what new they may purchase at advantageous figures.

The Californians are asking in the neighborhood of 12c wholesale for orange honey, with very little of it available.

If conditions keep up as they are now, the Texas Honey Producers' Association will likely have to import honey to supply the demand, although, of course, the later crops may be very much better.

One large producer and supply firm in the West is recommending a price of 12c per pound for orange honey and 10c per pound for sweet clover and alfalfa honey in carload lots.

Whether this is any indication of about what honey in jobbing lots will start at remains to be seen. It is not to be doubted, however, that honey should be held at a much stiffer price, especially in view of the fact that crop conditions throughout the country generally are under the ordinary.

It is true, however, that honey is not selling in very heavy quantities at retail although, of course, this is not surprising at this period of the year.

The crop of small fruits has been exceptionally good and the householder has been turning her thoughts to the canning of this fruit, even in the face of very high sugar prices.

All in all, we do not believe that honey prices will start nearly as low as last year. Remunerative prices should be maintained.

We expect to give a more extended report next month, with possibly some suggestions as to retail and wholesale prices for the coming crop year.

CLASSIFIED DEPARTMENT

Advertisements in this department will be inserted for 5 cents per word, with no discounts. No classified advertisements accepted for less than 35 cents. Count each initial or number as one word.

Copy for this department must reach us not later than the 15th of each month preceding date of issue. If intended for classified department it should be so stated when advertisement is sent.

As a measure of protection to our readers, we require references of all new advertisers. To save time, please send the name of your bank and other references with your copy.

BEES AND QUEENS

NEW HONEY IN JULY—Atwater.

MERRILL'S QUEENS—$1.00 each.
R. E. Merrill, Muncy, Pa.

INSURE your honey crop; order Simmons' queens and nuclei now. Get our prices.
Fairmount Apiary, Livingston, N. Y.

EUREKA QUEENS—American Breed—For particulars address A. C. F. Bartz Co., Keystone, R. F. D., Jim Falls, Wis.
Reference: Bank of Bloomer, Bloomer, Wis.

TRY PETERMAN'S QUEENS—They mean 100 per cent quality, select, thrifty layers, well laid up before caging bred from Jay Smith choice breeders by a thoroughly experienced breeder who is absolutely honest and reliable. Repeat orders prove this. Circular free. Prices, after July 1: 1, $1; 6 for $5.50; 25 at 90c each.
H. Peterman, Lathrop, Calif.

NUCLEI and package bees; send for circular.
Allen Latham, Norwichtown, Conn.

GOLDEN ITALIAN QUEENS—Produce bees solid yellow to tip; disease resisting, prolific, gentle and good honey gatherers. Untested, $1.25; select untested, $1.50 each; tested, $3.00.
Dr. White Bee Company, Sandia, Texas.

FOR SALE—Missouri bred Italian queens, $1 each; 6 for $5. L. E. Altwein,
1206 N. 13th St. St. Joseph, Mo.

FOR SALE—Bright three-banded Italian queens, 1 to 12, $1.25 each; 13 to 25, $1.15 each; 10 per cent discount when ordered 4 weeks or more in advance. Safe arrival and satisfaction guaranteed. Ready to ship June 1 to June 10.
R. B. Grout, Jamaica, Vt.

HARDY ITALIAN QUEENS, $1 each.
W. G Lauver, Middletown, Pa.

BEES BY THE POUND, ALSO QUEENS—Booking orders now. Free circular gives prices, etc. See larger ad. elsewhere.
Nueces County Apiaries, Calallen, Texas.
E. B. Ault, Prop.

SEE my display ad. in this number.
Jes Dalton, Bordelonville, La.

BEES AND QUEENS at reduced prices. Cypress hives for sale. Write for terms.
Otto Diestel, Elza, Ga.

SHE-SUITS-ME QUEENS—1923, after June 1, $1.50 each. One dollar per queen when ordered four weeks or more in advance.
Allen Latham, Norwichtown, Conn.

PETERMAN'S 100% QUEENS—$1 each, 6 for $5.50. Give them a trial.
H. Peterman, Lathrop, Calif.

CONNECTICUT QUEENS—Highest grade 3-banded Italians. Ready June 1st. Untested, 1, $1.15; 12, $12; 50, $47.50; 100, $90. Two-pounds bees with queen, $4.50; 3 pounds with queen, $5.50; two-frame nucleus with queen, $5; 3 frames with queen, $6. No disease. Safe arrival and satisfaction guaranteed. Conn. Valley Apiaries.
A. E. Crandall, Berlin, Conn.

FREE! FREE! FREE!—We will give free with each order for queen or bees, one of our patent applied for brood frames that we guarantee no sagging and the bees will build to the bottom bar—then see your nice comb. Queens, $1.00. Circular free.

Mr. Russell, Roxbury, Ohio. Dear Sir—The cheap cull queen from imported mother bought of you, wintered on two-frames with quart of bees, stored 100 lbs., a daughter 50-lbs. Thirteen powerful colonies with southern bred queens have 20 to 65 lbs less stores than in April, have made no surplus. This is a poor bee territory and has been the poorest year in past 40. Culls that can get honey while others starve is good enough for me. Yours, E. B. Foster.
F. M. Russell, Roxbury, Ohio.

THREE-BAND bright Italian queens for 1923. Guaranteed purely mated. Good hustlers and gentle. One, $1.00; 6, $5.00; 12, $9.00. Write for folder or the principle of introducing. Orders booked as received.
J. Frank Diemer, Liberty, Mo.

QUALITY ITALIAN QUEENS, large, gentle and prolific; $1.00 each, $10 per dozen.
J. J.Scott, Crowville, La.

FINEST ITALIAN QUEENS—$1.00 each.
Wm. R. Stephens, Wingate, Ind.

RUSH YOUR ORDER—Pure Italian queens: Selected tested, 1, $1.25; 12, $12. Selected untested, 1, 80c; 12, $8.00; 100, $60. Safe arrival and satisfaction guaranteed; no disease; ship nothing but the best.
W. C. Smith & Co., Calhoun, Ala.

THREE-BAND ITALIANS—My stock is developed by continuous selection from the best and most popular strains in the country. When I can produce or discover better they will be adopted. Queens: untested, after May 15, $1.50 each, six for $8. Tested, $2.50 each. CARNITALIANS, a cross derived from pure imported Carniolan mothers and Italian drones. Tested queens, June 1, $2.50 each. Protheroe, Rustburg, Va.

BURLESON'S three-banded Italian queens; none better; for balance of this season, 1, $1; 12, $10.50; 100, $80. Send orders and money to my manager, J. W. Seay, Mathis, Texas. T. W. Burleson, Waxahachie, Tex.

FOR SALE—Golden Italian queens. One untested golden Italian queen, $1. One tested queen, $2. Safe arrival and satisfaction guaranteed. J. F. Michael,
Rt. 1, Winchester, Ind.

THREE-BANDED ITALIAN QUEENS—Select, untested, $1.00. Select, tested, $1.50. Two-pound package bees with select untested queen, $4. Reference: The Selma National Bank, Selma, Ala. Satisfaction given.
J. Allen, Catherine, Ala.

IF WANTED—Good, bright Italian queens by return mail. Send your order for queens to us; $1 each, $10 per dozen, $75 per 100. Safe arrival, pure mating, reasonable satisfaction guaranteed.
P. B. Skinner, Greenville, Ala.

FANCY THREE-BAND BEES nuclei and queens. Queens, balance of season, select untested, $1 each, $10 a dozen. Select breeding queens $6 each.
J. L. Morgan, Apalachicola, Fla.

PURE ITALIAN QUEENS—Untested, $1.00; tested, $1.25; 2-lb. package, $2.75. Add price of queen wanted. Safe arrival guaranteed after May 10. Write for prices on colonies and other specials.
Birdie M. Hartle,
924 Pleasant St., Reynoldsville, Pa.

QUEENS bred from choice Jay Smith breeders, $1 each, 6 for $5.50; every queen guaranteed select, thrifty layer.
H. Peterman, Lathrop, Calif.

PURE Italian and Carniolan queens, the best of either race, $1 each. J. E. Wing.
155 Schiele Ave., San Jose, Calif.

FOR SALE—1923 Golden Italian queens, $1; dozen $10. Safe arrival and satisfaction guaranteed.
J. J. Sanford & Son, McKenzie, Ala.

CARNIOLAN-ITALIAN CROSS—Finest utility queens yet. While they last, $1 each.
Geo. W. Coltrin & Son, Mathis, Texas.

PINARD'S quality of Italian queens and package bees. Laying, untested queens, $1 each. Write for prices on large lots. Circular free.
A. J. Pinard, Morgan Hill, Calif.

QUEENS for the balance of the season of 1923. Write and get our prices.

O. P. Hendrix & Son, West Point Miss.

HAVE YOU SEEN my little ad. on page 360? Peter C. Tangen,
Rt. 3, Ossian, Iowa.

SELECT UNTESTED three-banded leather colored Italian queens by return mail at $2. Orders booked 15 days ahead, $1.50. Send for prices on large orders. These bees hold Indiana record for comb-honey average per colony in a run of ten years.
Charles Kennard, Knightstown, Ind.

REDUCTIONS in price on golden queens July 1st: selected queens, one, 90c; half dozen, $5; dozen, $9. Pure mating, safe arrival in U. S. A. and Canada. Health certificate furnished. Tillery Bros.,
Rt. 5, Greenville, Ala.

FOR SALE—Italian queens, $1, 12, $11; 100, $95; one 3-frame nucleus, $5; 3 lbs. bees, $6. Satisfaction guaranteed.
Hickory Shade Apiary, Otterville, Mo.

WARRANTED pure mated Italian queens, $1.25 each; 25 or more, $1.10 each. Mailed in special sure introducing cages. No honey used in candy.
Daniel Danielsen, Brush, Colo.

TRY MY 3-frame nucleus Caucasian or Italian race, reared from the very best mothers, which occupy 93 standard frames. Queens, tested, $1.50; untested, $1. Only Italians, by return mail. No disease.
Peter Schaffhauser, Havelock, N. C.

BIG, bright golden Italian queens. The kind that are bred for beauty and also honey gathering qualities. We guarantee to please you. Price 95c each, 6 for $5, 12 for $9.50. Tested $1.50.
Honoraville Bee Co., Honoraville, Ala.

GRIGGS super Italian queens. July 1, untested $1 each or $22.50 for 25 untested queens. Tested $1.50 each; choice breeders $10 each. Every colony in my breeding yard is headed by a breeding queen.
L. S. Griggs,
711 Avon St., Flint, Mich.

GOLDENS—From select breeders. Satisfaction and safe arrival guaranteed. Select untested, $1 each, 12 for $10, 25 or more 75c each. Tested $1.75 each, 12 for $18.00.
Box 838, San Antonio, Texas.

UNSURPASSED ITALIAN QUEENS—After July 1, untested: 1, $1.; 6, $5.75; 12, $11; 50, $45; 100, $85. Tested, 1, $2; 6, $11. Every queen is mated and laying before she is mailed.
J. D. Harrah, Freewater, Ore.

WILLOW DELL 3-band Italian queens are good queens, winter well, are good producers and will please you. If you haven't tried them, do it now. One untested queen, $1.15; 6 for $6; 12 for $10.
H. S. Ostrander, Mellenville, N. Y.

GOLDEN ITALIAN QUEENS for fall requeening. The big, bright, hustling kind. Satisfaction guaranteed. Price $1 each, six for $5, 12 for $10, 100 for $70. Tested $1.40 each. E. F. Day, Honoraville, Ala.

FOR SALE—Golden Italian queens: Untested $1, 6 for $5.40, 12 or more 80c each; tested $1.50; select tested $2.50. No disease of any kind. Safe arrival.
D. T. Gaster, Rt. 2, Randleman, N. C.

FOR SALE—Three-banded Italian queens, untested, $1 each; 6, $5.50; 12, $10. Tested queens, $2 each.
Robert B. Spicer, Wharton, N. J.

QUEENS—High grade Italian queens, three-banded; also goldens. Untested, $1 each; twelve, $9.00; tested, $1.50 each; twelve, $15. Package bees. Safe arrival and satisfaction guaranteed.
P. O. Watkins, Cullasaja, N. C.

3-BANDED QUEENS—$1.00 each, $85 per 100. Bees in any way desired.
Walker & Shaner, Scotts Station, Ala.

FOR SALE—Golden Italian queens. Untested, $1; six, $5.40; twelve or more, 80c each; tested, $1.50 each. No disease. Safe arrival. Hazel V. Bonkemeyer,
Rt. 2, Randleman, N. C.

FATHER JOHN'S 3-banded Italians for queen breeders and experts; 100 per cent more brood this spring than my best queen for 25 years. Mated separately on extracting frames to selected drones. Guaranteed excellent color, hardy, very gentle. Select untested, $1.50; select tested, $2.50.
Rev. J. Dewild, Wautoma, Wis.

MERRILL'S three-banded Italian queens are guaranteed to arrive safely and give satisfaction. Queens will be ready for shipment June 1, $1 each. Try them.
R. E. Merrill, 125 Mechanic St., Muncy, Pa.

REDUCED PRICE—Italian queens, very beautiful, but not bred for color alone; very profitable, produce bees that are gentle and hustlers. One introduced into each of your colonies in summer will overcome so much winter loss. Mated to Italian drones. Clipped free when requested. One, 75c; six, $4.00; twelve, $7.50; virgins, 25c each. Satisfaction or money back.
Crenshaw County Apiary, Rutledge, Ala.

"THE PROOF of the pudding is the taste thereof." So with queen bees, you cannot judge their quality by a page-long ad. Try my three-banded Italian queens and know their worth. Safe arrival and satisfaction guaranteed. Circular free. Select untested queens 75c each.
P. M. Williams, Ft. Deposit, Ala.

FOR SALE—Golden Italian queens, 1 for $1.15, 6 for $6.50, 12 or more $1 each; tested $2 each; select tested $3 each. After June 30: Untested $1 each, 6 for $5.40, 12 or more 80c each; tested $1.50 each; select tested $2.50 each. No disease of any kind. Safe arrival and satisfaction guaranteed.
Sam Hinshaw, Randleman, N. C.

CARNIOLAN QUEENS—Pure silver gray Alpine stock. Good queens, ready to go. Normal conditions. Satisfaction guaranteed. Price, untested: 1, $1.00; 6, $5; 12, $9; 25 or more, 70c each.
M. G. Ward, Lathrop, Calif.

HOLLOPETER'S quality queens and satisfactory service will please you. Untested queens from finest three-banded stock, each $1.25; 6 to 25, $1 each. No disease and safe arrival guaranteed.
J. B. Hollopeter, Rockton, Pa.

HONEY AND BEESWAX

MERRILL'S QUEENS—$1.00 each.
R. E. Merrill, Muncy, Pa.

FOR SALE — White and amber extracted honey. Write for prices. State quantity wanted. Dadant & Sons, Hamilton, Illinois.

FOR SALE—Choice clover extracted honey in new cans and cases, in carload lots or case lots. Quality unexcelled. Write for prices stating quantity desired.
J. D. Beals, Oto, Iowa.

FOR SALE—Our own crop white clover and amber fall honey in barrels and cans; also white alfalfa in cans. State quantity wanted and we will quote prices. Samples on request.
Dadant & Sons, Hamilton, Ill.

FOR SALE—White honey in 60-lb. cans; also West Indian in 50-gal. barrels. Samples and prices on request. A. I. Root Co.,
23 Leonard St., New York City, N. Y.

HONEY FOR SALE—In 60-lb. tins; water white orange, 15c; white sage, 13c; extra light amber sage, 11c; white clover, 13c; buckwheat, 10c; star thistle, 14c, for immediate shipment from New York.
Hoffman & Hauck, Woodhaven, N. Y.

BEESWAX WANTED—We need large quantities of beeswax and are paying good prices now. Ship to us at Hamilton, Ill., or Keokuk, Iowa, or drop us a card and we will quote f. o. b. here or your own station, as you may desire. Dadant & Sons, Hamilton, Ill.

SUPPLIES

NEW HONEY IN JULY—Atwater.

MERRILL'S QUEENS—$1.00 each.
R. E. Merrill, Muncy, Pa.

FOR SALE—90 cases, 60-lb. cans, two in a case, 70c per case. Honey was liquefied with dry heat, leaving the cans in extra fine condition. Also 80 full depth, 10-frame extracting supers with plain frames, nailed but not painted, all brand new; Lewis make, $1 each.
John C. Bull, Valparaiso, Ind.

FOR SALE—Automatic entrance bee feeders; also Canadian patent right. Descriptive circular free.
L. H. Achenbach, Manufacturer,
Pottsville, Pa.

CONNECTICUT and Rhode Island headquarters for Root's Beekeepers' supplies.
A. W. Yates, 3 Chapman St., Hartford, Conn.

WESTERN BEEKEEPERS—We can demonstrate that you can save money on buying bee supplies of best quality. Write for our latest price list.
The Colorado Honey Producers' Association,
Denver, Colo.

FOR SALE—Hives, 8 or 10-frame, with frames, $2.50 each; extracting supers with frames, $1.00. Supers for comb honey, complete, $1.00. Extractor, $12.00. Uncapping tank, $10.00; 60-gallon honey tank, new, $10.00; 5-gallon cans, new, 2 for 90c; wood wire queen excluders, 40c; queen traps, 35c. The above are all Root goods. Hives are for Langstroth frames; 100 Carey hives, $1.75 each; 100 home-made hives, with frames, new, $1.00 each; feeder, one-half price. Anything you wish in the bee business for half price.
Chas. Hamel, North Adams, Mass.

HAVE YOU any Bee Journals or bee books published previous to 1900 you wish to dispose of? If so send us a list.
American Bee Journal, Hamilton, Ill.

FOR SALE—200 second-hand 8-frame hives, complete, $1 each. Also 300 supers with section holders, 40c each. Good as new. Lots to right buyer. Free from disease..
John Roorda, Thayer, Ind.

FOR SALE—100 8-frame shallow supers with frames, 25c each, f. o. b. here.
J. Curtis Alexander,
Rt. No. 1, Asheville, N. C.

FOR SALE—60 shallow supers (Root make), 8-frame (new, never used), will take 4x5, 3⅝x5 or 4¼x4⅜ in. sections or shallow (5⅜ in.) extracting frames, at 50c each in lots of five; special price on lot. Want a Barnes or similar saw.
Nic Klein, Hudson, Iowa.

FOR SALE—Genuine Hoffman shallow extracting frames, $2.75 per 100. Brand new, in original boxes.
Bert Willard, Plainview, Ark.

FOR SALE—90 new 10-frame extracting supers in flat.
Chester W. Keister, Orangeville, Ill.

FOR SALE

MERRILL'S QUEENS—$1.00 each.
R. E. Merrill, Muncy, Pa.

FOR SALE—Good second-hand 60-lb cans, 2 cans to a case, boxed, at 60c per case, f. o. b. Cincinnati. Terms cash.
C. H. W. Weber & Co., 2163 Central Ave.
Cincinnati, Ohio.

IN LIQUIDATION of an estate there will be sold some time this summer or early in the fall, one of the best locations in eastern Wisconsin for an apiary, with miles of basswood near and in midst of clover region; exquisite view, substantial residence, orchard, etc.; 4 acres at edge of incorporated village; good transportation facilities; adapted for maintenance of several hundred swarms. Address, Administrator,
809 Tonka St., Appleton, Wis.

SAVE MONEY—Apiary of 54 colonies and all supplies to be sold in small lots or large. Send for list.
James McKee, Riverside, Calif.

FOR SALE—300 colonies of bees with complete extracting equipment. Your correspondence solicited.
Scott McClanahan, Notus, Idaho.

FOR SALE—450 colonies of bees in 8 and 10-frame hives. Fully equipped to handle the package business and for honey production. New four-frame automatic extractor. Queen-rearing establishment with nearly 500 nuclei in operation and equipment enough to build up to 800 or 1,000. A fine mailing list of live customers that provide enough business for two good men the year round and growing fast. Good kerosene engine and beehive machinery, complete, for making all supplies. Will sell all or part of the above, our option. No disease has ever been in our bees. This is a walkout proposition with great possibilities for someone who wants an established business right off the start, with everything you could wish for; well located in the South. Good reason for selling. Address
"J," care American Bee Journal,
Hamilton, Illinois.

FOR SALE—Our own crop white clover and amber fall honey in barrels and cans; also white alfalfa in cans. State quantity wanted and we will quote prices. Samples on request.
Dadant & Sons, Hamilton, Ill.

MISCELLANEOUS

NEW HONEY IN JULY—Atwater.

THE "Archiv fur Bienenkunde" is a valuable scientific publication. "It merits the appreciation of all beekeepers acquainted with the German language," says the Bee World (January, 1923). "The Archiv fur Bienenkunde, now in its fifth volume, is of as high grade as any bee journal which comes from abroad, dealing especially with the scientific aspects of beekeeping," says Gleanings in Bee Culture (February, 1923). Annual subscription, $1. Specimen copy free. Publisher, Theodor Fisher, Freiburg im Breisgau, Kirchstrasse 31, Germany.

THE BEE WORLD—The leading bee journal in Britain, and the only international bee review in existence. It is read, re-read and treasured. Will it not appeal to you? Specimen copy free from the publishers. The Apis Club, Benson, Oxon, England. Send us a postcard today. It is well worth your little trouble.

BROTHER BEEKEEPERS—Are you troubled with thieves? We guarantee our yard-bred Airedales will solve that problem. Intelligent, fearless, loyal to the core. Faithful watch-dogs, good companions for children. The dog every honey producer should have on the premises. Strong, vigorous Airedale puppies, $20; either sex. Delivery guaranteed. Order now.
Hygienic Honey Co., Hillman, Mich.

WANTED

NEW HONEY IN JULY—Atwater.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade prices, charging but 5c a pound for wax rendering. Fred W. Muth Co.,
204 Walnut St., Cincinnati, Ohio.

BEESWAX WANTED—We need large quantities of beeswax and are paying good prices now. Ship to us at Hamilton, Ill., or Keokuk, Iowa, or drop us a card and we will quote f. o. b. here or your own station, as you may desire. Dadant & Sons Hamilton, Ill.

WANTED—Old postal stamps and envelopes.
R. LeMang,
25 Quincy St., Passaic, N. J.

WANTED—Comb honey.
A. S. Jamison, 690 Adams Ave.
Memphis, Tenn.

WANTED—4-frame reversible power extractor, 12-inch pockets, with or without engine. A. Mottaz,
645 1st Ave., Ottawa, Ill.

"World's Best
HONEY"
Florida's Fancy Tupelo and Orange.
Write for prices.
T. E. GRINSLADE
Dalkeith, Florida.

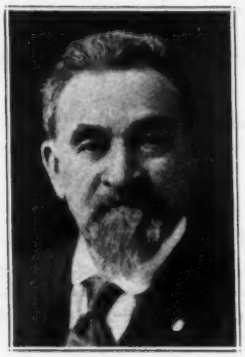
$1 GOLDENS
From now until October 1, untested queens, $1 each or 6 for $5; 50 queens $40.
Promptness and satisfaction guaranteed.
R. O. COX, Rutledge, Ala.

BURR COMBS

Who Is Who Around the Office?

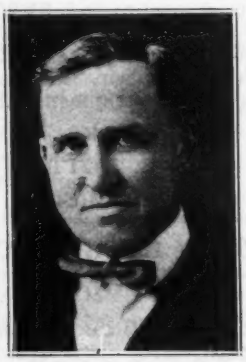
By Frank C. Pellett.

I AM glad of this page of "Burr Combs" back here among the advertising pages, for it makes a place for odds and ends that are hardly suited to the reading pages. Just now I want to tell something about the publishers of the American



C. P. Dadant.

Bee Journal. In traveling about the country I have found that many people are confused about the various members of the Dadant family. They know, of course, that the firm is known as Dadant & Sons, but few know how many sons there are or what are their names, and fewer still are familiar with the fact that the daughters are also active in the business. Having been many times reminded by friendly readers that some information concerning the family would be appreciated, I am taking the liberty of introducing them on this page, without the knowledge of the



L. C. Dadant.

boss.

The beginning of the Dadant business was in 1864, when the late Charles Dadant bought two colonies of black bees in box hives and took them to his home on a small farm in the woods two miles from Hamilton. Charles Dadant was a careful observer and a deep student of anything which interested him. The bees soon occupied his attention to the exclusion of other things which had formerly been of principal interest. There is no room to tell the story of the growth of the apiaries which developed from the two colonies in box hives. Neither is there room to tell about the development of the foundation business which started with the help of his son, C. P. Dadant, when the two made foundation by hand under an oak tree in the back yard for their own use and also for the neighbors. Charles Dadant lived to see beekeeping change from a hobby to a recognized industry and to play an important part in bringing about the change. He died in 1902.

It is seldom that an entire family

Henry C. Dadant.

continues to work together in one business for three generations. C. P. Dadant, the only son of Charles, continued the business until his three sons and two of his daughters were ready to assume full responsibility and to relieve him fully. Mr. Dadant senior has recently passed his 72nd birthday and has been retired for several years. Retiring for him, however, simply meant that he proposed to select his own job and leave such work as he does not enjoy to others. Although he does his work at home and stays away from the Journal office and the factory, he works as

M. G. Dadant.

much as any of us, and knows what is going on. The first picture then is the senior member of the firm.

There are three sons, all of whom are associated in the business. The eldest is L. C. Dadant (everybody calls him "Louie") the general manager at the factory. His principal regret in life is that he is kept so busy at the factory all summer that he no longer has time to help with the bees. He consoles himself with a hunting

Miss Valentine Dadant.

trip in the fall. Louie is always happy when the bass are biting or the ducks are flying.

Henry Dadant the second son, is the research man of the firm. None of the Dadants are noisy and Henry makes less noise than the rest, but he is always busy finding better ways to work wax or wire foundation or find some new kink which will make the factory run more efficiently or make the beekeepers' work easier. The invention of the new vertical wired foundation is a sample of Henry's work.

Maurice, who signs himself M. G., is the business manager of the Ameri-

Miss Clemence Dadant.

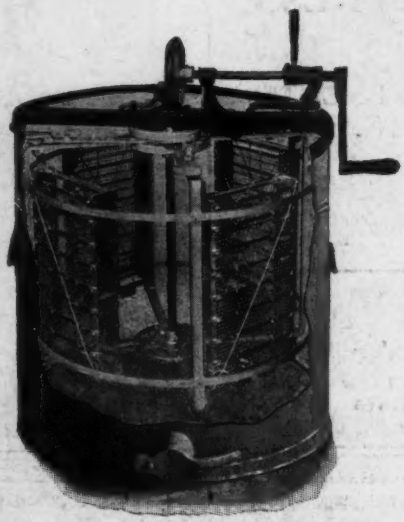
can Bee Journal, as well as a lot of other things. He is the one with whom I am most intimately associated. As the Journal office is two miles from the factory, I don't see much of Louis or Henry, but Maurice is right there on the job every day. M. G. is a bear for work and when I see what he does I feel like a loafer. If I had to do as much work as he turns out I would resign my job and take to the woods.

Two of the daughters are married and are not directly concerned with the business, although the husband of the eldest, Leon Saugier, has charge of sheeting the wax at the factory. There are two of the girls, however, who are active in the affairs of the Journal. Miss Valentine spent about ten years in charge of the mail and as cashier at the Journal office. She still reads the proof, but Miss Clemence it is now who opens your letters and credits your subscription or advertising account.

WHAT MAKES
ROOT EXTRACTORS

THE BEST AND MOST SERVICEABLE ON THE MARKET

NINE SIZES



4-fr. Multiple Reversing Extractor

Points of Superiority

1. Tank of heavy guage, galvanized steel, seams double-locked and soldered.
2. Cone-shaped bottom makes it extremely rigid and facilitates emptying.
3. Heavy iron hoop at the top, and bottom is reinforced by a strong iron rod.
4. The reels revolve on ball bearings and with a minimum amount of friction.
5. The new comb pockets are of a more rigid construction.
6. The center shaft is larger in the 1923 eight-frame machines, and therefore they are better fitted to stand the strain.
7. Properly balanced—all important.
8. The brake is of the contracting band type, and is reliable and powerful.

View showing strong construction of pockets furnished with all extractors except the Novice.

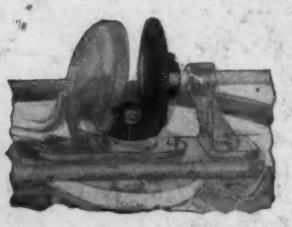
Root Buckeye Power Extractors are capable of 300-350 revolutions per minute, running smoothly and without any strain. This high speed is essential to satisfactory extracting and is considerably greater than that of any other extractor on the market. The pockets can be reversed while the extractor is going at full speed.

View of top ball bearing furnished with all extractors.

Root Extractors are guaranteed to give service, because behind every extractor stands a thorough knowledge of extracting problems, worked out by years of tests and experience A. I. Root built the first metal extractor in America in 1869, the Novice, and many have given good service for over forty years.

WE CAN HANDLE YOUR EXTRACTING PROBLEMS

Write for our catalog and lowest prices on complete extracting equipment.



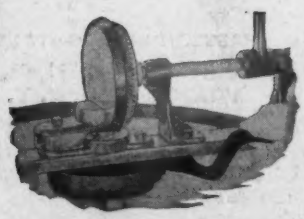
View of new durable gears furnished with all hand power extractors. Built for economical extracting.

THE A. I. ROOT COMPANY

WEST SIDE STATION

MEDINA, OHIO

52 Years in the Beekeeping Service



Root extractors have good brakes. Built for dependable service.